WHAT INFLUENCES PRESCRIBING IN PRIMARY CARE?

A THESIS THAT INVESTIGATES RELATIONSHIPS BETWEEN PRESCRIBING, POLICY AND PERCEPTIONS.

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January 2005

Thesis submitted in part of fulfilment of the requirements of the University of London degree of Doctor of Philosophy
Declaration

This thesis describes research conducted in the School of Pharmacy, University of London between 2001 and 2004 under the supervision of Dr Catherine Duggan and Mr Ian Bates. I certify that the research described is original and that any parts of the work that have been conducted by collaboration are clearly indicated. I also certify that I have written all the text herein and have clearly indicated by suitable citation any part of this dissertation that has already appeared in publication.

[Signature]  [Date]

19/06/05
Abstract

The quality and expenditure of prescribing have significant implications for patient care and public health and is therefore one of the top priorities within the NHS. However, influencing general practitioners' (GP) prescribing patterns have proved challenging. Resistance to change is influenced by issues such as the GP personal and professional experiences, the relationship with the patient and the perceived tension between primary and secondary care. The aim of this project was to investigate the significant influences on prescribing in two neighbouring Primary Care Trusts (PCT) using multiple methods taking a pragmatic approach.

A questionnaire was designed to measure GPs' perceptions of prescribing influence in the two PCTs. From this study, a K-means cluster analysis grouped GPs according to their attitudes towards prescribing influence. Subsequent analysis of prescribing trends revealed that prescribing patterns were related to GPs' perceptions of prescribing influence. Relationships between national and local prescribing initiatives and prescribing trends were analysed and intervention analysis quantified the effects of prescribing change over time. These analyses showed that prescribing incentive schemes have a measurable effect on generic prescribing. Attitudes towards prescribing were further explored in-depth in interviews with GPs and stakeholders from the PCTs and the Health Authority (HA). The analysis exposed different perceptions and areas of potential conflict between stakeholders and GPs in regard to the prescribing agenda. The studies that comprised the thesis were triangulated in discussions on the influencing factors on prescribing. It could be concluded that GPs differed in their perceptions of the factors that influenced prescribing as well as their prescribing practice. The results imply that prescribing interventions need to be developed in line with the views of prescribers and policy makers. Additionally, these interventions should be tailored to different types of GPs holding different perceptions in order to optimise resource use and maximise prescribing change as and where appropriate.
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## Abbreviations

Common abbreviations that are used in the thesis are included; this list is not exhaustive.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>ADQ</td>
<td>Average Daily Quantity</td>
</tr>
<tr>
<td>ASTRO-PU</td>
<td>Age Sex Temporary Resident Originated Prescribing Units</td>
</tr>
<tr>
<td>BMA</td>
<td>British Medical Association</td>
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<tr>
<td>BMJ</td>
<td>British Medical Journal</td>
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<tr>
<td>CH or (Ch)</td>
<td>Chapter</td>
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<tr>
<td>GMS</td>
<td>General Medical Services</td>
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<tr>
<td>GP</td>
<td>General Practitioner</td>
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<td>GPC</td>
<td>General Practice Council</td>
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<td>GPRD</td>
<td>General Practice Research Database</td>
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<tr>
<td>HA</td>
<td>Health Authority</td>
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<tr>
<td>NIC</td>
<td>Net Ingredient Cost</td>
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<td>NHS</td>
<td>National Health Service</td>
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<tr>
<td>NICE</td>
<td>National Institute for Clinical Excellence</td>
</tr>
<tr>
<td>NPC</td>
<td>National Prescribing Centre</td>
</tr>
<tr>
<td>NSF</td>
<td>National Services Framework</td>
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<tr>
<td>OTC</td>
<td>Over The Counter</td>
</tr>
<tr>
<td>PACT</td>
<td>Prescribing Analysis and Cost</td>
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<td>PCG</td>
<td>Primary Care Group</td>
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<td>PCT</td>
<td>Primary Care Trust</td>
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<tr>
<td>PO</td>
<td>Prescription Only</td>
</tr>
<tr>
<td>PPA</td>
<td>Prescription Pricing Authority</td>
</tr>
<tr>
<td>PSU</td>
<td>Prescribing Support Unit</td>
</tr>
<tr>
<td>PU</td>
<td>Prescribing Unit</td>
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<tr>
<td>Q&amp;OF</td>
<td>Quality and Outcomes Framework</td>
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<tr>
<td>RPSGB</td>
<td>Royal Pharmaceutical Society of Great Britain</td>
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<tr>
<td>SHA</td>
<td>Strategic Health Authority</td>
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<tr>
<td>SH</td>
<td>Stakeholders</td>
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<tr>
<td>STAR-PU</td>
<td>Specific Therapeutic Group Age Sex Related Prescribing Units</td>
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<tr>
<td>PIS</td>
<td>Prescribing Incentive Scheme</td>
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<td>VAS</td>
<td>Visual analogue scales</td>
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Glossary

The definitions in this glossary serve the purpose of this thesis and the list is not exhaustive to what comprise the thesis. Some definitions were developed during this project where meaningful while other definitions were taken from dictionaries (e.g. Oxford Dictionary 10th Ed).

Attitude
A settled way of thinking

Characteristics
A feature or quality typical of a person, place, or thing. Size and type of a practice are examples of characteristics referred to in this thesis.

Cluster items
The six questionnaire items used in cluster analysis as presented in chapter four

Commercial influences
For the purpose of this thesis, commercial prescribing influence was defined as an activity undertaken by the pharmaceutical industry to market their products

Demographics
The structure of human populations using statistics relating to births, deaths, wealth, disease, etc. This was extended to include age and gender.

Drug
A medicine or other substance which has a marked physiological effect when taken into the body. A substance with narcotic or stimulant effects

General practice
Family practice, doctor surgery within primary care. Commonly patient’s first point of contact seeking health care

Group practices
Six or more partners within the same practice as defined by the Audit Commission in 2002

Essential services
Definition used in GMS practices: The management of patients who are ill or believe themselves to be ill, with conditions from which recovery is generally expected, for the duration of that condition, and the general management of patients who are terminally ill” as defined by the Audit Commission in 2002

Incentive
Something thing that is intended to motivate or encourage someone to do something. Often a payment or concession to stimulate greater output or investment
Imperative
An activity or initiative of vital importance, an essential or urgent thing. To give authoritative command

Initiative
A fresh activity

Intervention
The action or process of intervening through applied activity, interference by a state in another’s affairs, action taken to improve a medical disorder.

Main researcher
Principal researcher; in this case the same as the author of this thesis: Kristina Åström =Main investigator

Medicine
A drug or other preparation for the treatment or prevention of disease

Non-commercial influences
Sources of information that have no added commercial benefit for either the receiver or the sender. Examples of non-commercial sources in this thesis are the NHS, the HA, the PCT, local formularies

Opinion
A view, not necessarily based on a fact

Outreach visits
Also known as academic detailing, counter detailing, educational outreach

PCT advisor
PCT personnel working with prescribing related issues

PCT personnel
People employed by the PCT

PCT representative
A person chosen or appointed to act or speak on behalf of the PCT

Perception
A way of regarding, understanding or interpreting something. It may not be the truth.

Pharmaceutical advisor
Pharmacists that visited GPs practices and disseminated prescribing advice under the PCT were called pharmaceutical advisors (PA) in this thesis. The GPs did not distinguish between pharmacists in the interviews (CH6) and called all pharmacists working at the PCT for Pharmaceutical Advisors, although some may have held the job title Prescribing advisor or Support pharmacist. For simplicity all PCT pharmacists working with primary care prescribing issues were called Pharmaceutical Advisors in the thesis
Glossary

Policy personnel
Stakeholder (see Stakeholder)

Pragmatic
Dealing with things in a way that is based on practical rather than theoretical considerations

Pragmatism
A pragmatic attitude or policy, an approach that evaluates theories or beliefs in terms of the success of their practical application

Prescribing
To advise and authorize the use of (a medicine or treatment), especially in writing. To issue a prescription

Prescribing agenda
The practical and political imperatives that are set to manage prescribing within primary care

Prescribing behaviours
The way in which a doctor responds to a situation or stimulus (in the prescribing process) which generates the prescribing profile

Prescribing board
The PAs and GPs that formed local boards where new therapies and prescribing issues were discussed

Prescribing Committee
The group of people that were appointed to evaluate drug therapy within the PCT and the NHS Trust. These included the PAs and prescribing pharmacists

Prescribing habits
A settled or regular tendency or practice in terms of prescribing of drugs

Prescribing influences
Influences of prescribing are in this thesis interchangeably called prescribing influences. Influences are suggested and presented in this thesis while there may be many more that influence a GP’s prescribing

Prescribing lead
The person within each practice that is appointed to take the main responsibility for and lead prescribing within the practice. Conduct would include informing peers of new advice and communicating with authorities. Can be the Principal prescriber.

Principal prescriber
The GP named in the PACT database. Often a partner of the practice. Can be the Prescribing lead.

Prescribing policy
A course or principle of action adopted or proposed by an organisation regarding
prescribing conduct

**Principal researcher**
Main researcher: in this case the same as the author of this Thesis: Kristina Åström
=Principal investigator

**Profession**
A paid occupation that involves training and formal qualification

**Project board**
The decision-making body of the project which included the main researcher, the supervisor, one PA from PCT1, and two PAs from PCT2

**Query**
A command in the PACT database to retrieve a certain detail of prescribing data

**Stakeholder**
1. Stakeholders are employees that work with policy of health care within the NHS or the Department of Health. For the purpose of CH6 in this thesis Stakeholders (SH) comprise PCT and Health Authority personnel that worked with prescribing issues and the principal pharmacists in the two adjoined hospitals of PCT1 and PCT2.
2. Not a GP; often a pharmacist working in the PCT or Health Authority (now Strategic Health Authority) organisation. A person representing one of the below organisations is called a “stakeholder” in this project.
   - National organisations that represent health professionals directly providing those services
   - Primary care organisations and acute trusts that have been selected at random and invited to become stakeholders by the Institute (http://www.nice.org.uk)

**Supplementary prescribing**
A voluntary prescribing partnership between and independent prescriber and a supplementary prescriber, to implement and agreed patient-specific clinical management plan with the patient’s agreement

**WTE**
Whole time equivalent. WTE staff is calculated by aggregating the total number of contracted hours of staff and dividing by the standard hours for that staff grade. In this way, part-time staff is converted into an equivalent number of ‘whole-time’ staff. (Department of Health, Work census Definitions 2003, accessed 21/04/04) www.dhsspsni.gov.uk/publications/ 2003/workcensus/Definitions.pdf –
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Acknowledgements

I would like to thank my principal supervisor Catherine Duggan for her exceptional enthusiasm and creativeness in every stage of this project: your support, involvement and high quality constructive advice throughout was remarkable!

Ian Bates, my co-supervisor, I thank him for his efforts in transferring your excitements about statistics and for convincing me to do a PhD in the first place: much is because of you!

I greatly appreciate the prescribing team in PCT1 for funding this project and for being part of the project board discussing the development of this project. I am likewise grateful to the prescribing team in PCT2 who also contributed funding and equally were members of the project board. My thanks include your provision of information and accommodation for the collection of prescribing data.

My appreciation extend to all participants in the studies who generously gave up their time for participation without any reimbursement, including the GPs and prescribing teams in both PCTs, the personnel in the then Health Authority, and personnel from other PCTs within the Health Authority. I am thankful to the GPs and pharmacists in South London who gave time to piloting the interview schedule and to the Senior Information Manager in the Health Authority who provided demographic data on the GPs: your participation made this project possible.

My family, James and my flower girls -thanks for your genuine support in all meanings of the word.
The purpose of this work was to investigate influences on prescribing within primary care in two Primary Care Trusts (PCT) in London, UK. Quantitative and qualitative methods were used encompassing various analytical techniques in order to evaluate stakeholders and general practitioners' (GP) perceptions of prescribing and to link GPs' perceptions with prescribing data. A model that described and predicted prescribing was built and recommendations were made to practice.

The thesis comprises seven chapters. Chapter one, the Introduction, gives an overview of prescribing within primary care. Literature on ‘good prescribing’ together with studies that looked at prescribing behaviour and the impact of outreach programmes provide the framework on which the project is designed. The chapter also explores national and local prescribing policies and recommendations from authorities on how to manage prescribing in the PCTs. While the type and number of perceived factors influencing prescribing may not be exhaustive in this thesis the efforts were to include a range of issues guided by literature, experts and the study subjects.

The second chapter sets the aims and objectives of the thesis and outlines the methods used. The second chapter gives a brief background to the environment wherein the study is set.

Chapter three provides an overview of methods used in the thesis. The descriptions of methods are not exhaustive but aim to provide a base for understanding of the thesis contents. The two PCTs where the project was set were described last.

Chapter four presents GPs' perceptions of prescribing influences that was investigated through a posted survey at two time points. This was done in efforts to learn about the views of the local GP population and whether perceptions changed over a 2-year period. The subjects were grouped, clustered, through statistical methods and differences between formed clusters were described. Reliability and validity of the
clusters was established through repeated studies and subsequent interviews with subjects from each cluster.

In chapter five GPs' perceptions of prescribing influence were matched with prescribing data. Data on local prescribing activities undertaken by the PCTs were collected and analysed. The effect of prescribing incentive schemes on prescribing trends was quantified. The chapter comprises several experiments to establish relationships between prescribing trends and factors such as PCT; perceptions of prescribing; national prescribing imperatives; local prescribing interventions; and patient population.

Chapter six presents deeper explanations to what influences prescribing and what barriers and facilitators there are when implementing initiatives. Semi-structured interviews were conducted with 20 GPs and 17 stakeholders (PCT pharmacists and NHS policy strategists). The results were presented as four themes i) a general overview of influences, views on ii) roles of the PCT organisation, iii) prescribing initiatives initiated by the PCT such as formularies and prescribing incentive schemes and iv) commercial influences. For relevance to practice comparing GPs' and stakeholders' views proved useful.

Chapter seven, which is the last chapter, triangulates the findings from previous chapters and discusses the implications of the project findings taking a wide perspective. Potential conflicts when implementing findings are assessed and recommendations for actions to stakeholders made. Methodological difficulties, limitations and areas for further research are also highlighted.
CHAPTER 1

INTRODUCTION
1.1 INTRODUCTION

Medication is one of the most common ways in which general practitioners (GP) treat illness; two-thirds of the consultations generate a prescription (Campbell et al., 2000). This may be why prescribing is held as one of the most important tasks for GPs (Kamps et al., 2000) (von Ferber et al., 1999). About 660m prescriptions are dispensed each year in England and Wales (Department of Health, 2003a) and each GP generates on average 250-350 prescriptions per week; making it a costly and time-consuming activity (National Prescribing Centre and The NHS Executive, 1998). As prescribing is central to GPs, primary care is central to the National Health Service (NHS) with nine out of ten patient journeys starting in the GP practice. On average, men consult their GP four times per year and women five (Healthcare Commission, 2004).

Prescribing of medicines is of interest to a wider audience than just doctors and patients. Health policy makers, stakeholders, the pharmaceutical industry and also the World Health Organisation (WHO) all issue advice in efforts to guide prescribing. One reason for this is that prescribing is costly and one of the quickest rising expenditure sectors within health care (Audit Commission, 2003). Although, the interest in prescribing is not new; Parish (1973) explained over three decades ago that the great interest was due to the large number of agencies involved, or indirectly involved in the prescribing process. Although eclecticism is important in a subject as complex as prescribing, this thesis takes mainly two perspectives; that of GPs and that of stakeholders within the Primary Care Trusts (PCT).
The literature review presented in this chapter forms the introduction to the thesis (figure 6.1). The chapter is made up of two parts:

- **Part I** outlines prescribing in primary care in the UK, the functions of the Primary Care Trusts (PCTs) and their opportunities and abilities to deliver on public health. A historic overview of primary care prescribing policy is described reflecting that of today. The costs of prescribing of medicines and how to achieve efficient prescribing are also discussed.

- **Part II** describes tools and appraises methods that have been used to inform and influence GP prescribing, such as clinical guidelines, prescribing incentive schemes, pharmaceutical outreach, analysis of prescribing trends and drug representatives. National and local initiatives to increase quality of prescribing are discussed. Barriers to changing prescribing habits and how prescribing practice can be modified are discussed here as well as throughout the thesis.

As the study is set in the UK health care system, the majority of appraised literature is UK based yet without entirely ignoring international contributions. The chapter aims to provide a factual account of prescribing within UK primary care in the way it is relevant to this thesis.
1.2 METHODS

1.2.1 Literature search
Literature search was performed using the electronic databases MEDLINE, EMBASE, PUBMED, IPA and Ingenta On-line Services. Specific journals that were hand-searched included the British Medical Journal (BMJ), Pharmaceutical Journal, Quality and Safety in Health Care, Journal of Health Care and Research Policy, and the International Journal of Pharmacy Practice. Web pages were consulted on a regular basis to keep up-to-date with health policy. The foci of the searches were to retrieve literature on primary care health policy, influences on prescribing and how to implement change in prescribing.

1.3 PART I

1.3.1 Primary care and prescribing in the UK
The purpose of this section is to give a background of the pertinent changes and developments within primary care together with reasons to control prescribing which sets the scene for prescribing initiatives.

1.3.1.1 Introduction
The NHS is recognised as one of the best health services in the world by the World Health Organisation and has kept this position by introducing change continuously (NHS Homepage). A major and recent change within primary care was the Department of Health giving power to the PCTs to lead primary care delivery, hence moving formerly central powers to local organisations (Department of Health, 2001b). This was partly done to promote a more patient-centred service where inequalities in health were reduced. The report “Shifting the balance of power within the NHS – Securing delivery” (2001b) recognised the need to support health care staff in the fast changing environment in order to sustain an environment receptive to change. The large proportion of the total NHS budget (75%) reflects the importance of and responsibility that primary care has been given (Craig, 2003).
1.3.1.2 History of primary care and general practice

The creation of the NHS in 1948 gave every citizen in the UK access to a GP. With this reconfiguration GPs remained independent but agreed to provide a 24h-service and to register all their patients. The doctors were paid per patient signed up on their list and additional payments were received for special services such as out of hour visits, maternity care and vaccinations.

Since then, the management and organisation of primary care have repeatedly changed with the changes in political power between the Conservative and the Labour Governments. A major cultural shift was the introduction of an internal market passed into law by the Conservatives in 1990. This political action addressed the escalating drug costs through the so-called fundholding scheme, which was a voluntary option for GPs to manage their own practice budget (including the prescribing budget) and to negotiate services for their practice for e.g. routine diagnostic testing and elective surgery (Stewart-Brown et al., 1995). Health authorities would continue to negotiate health care services for practices that decided not to join the fundholding scheme.

The internal market was set out as a way for NHS providers to try to control prices. This however, contributed to inequalities in patient care since care became dependent on how the practice decided to spend their money and was able to negotiate with service providers (All Party Parliamentary Group, 2002). This inequality became widely known as the 'postcode lottery'; depending on where you lived the care you received could vary substantially. There was evidence that patients were treated more rapidly if their GP was a fundholder which generated suspicions that fundholding practices were given more generous budgets (Bevan, 1998). GPs that did not join the fundholding scheme were perhaps dissuaded by the increase administrative burden that the scheme caused.

The fundholding scheme is of interest to this thesis as a novel way to try to contain costs. It was found that fundholding practices adopted generic prescribing at a greater rate and controlled their volume of prescribing better than non-fundholding practices but this effect, however, was only short-term (1 year) and not long-term (5 years) (Whynes et al., 1997; Harris and Scrivner, 1996). Another study showed that prescribing costs were not contained any better in fundholding practices when measured over a three-year period (Stewart-Brown et al., 1995). Presented studies did not
investigate whether initial savings were due to prescribing costs being transferred e.g.
through referral to secondary care.

The scheme was implemented to cut waiting times for patients and reduce unnecessary
hospital referrals but was criticised for generating less savings than its set-up and
administration costs (Gosden, 1997). The fundholding scheme was soon replaced with
Primary Care Groups (PCG) when the current Labour Government came into power in
1997. GPs thereby lost the financial independence they had in the fundholding scheme.
Bairbre de Brún (Minister for Health, Social Services and Public Safety, 1999)
motivated the closure of the fundholding scheme as such:

"I intend to bring forward proposals as soon as possible to end the GP Fundholding Scheme. I want to end
the inequalities that were part of this scheme and its association with a market for health care. Health and
social care is all about building partnerships and co-operation, not about markets and competition."
(The Northern Ireland Executive Homepage)

The change agenda for health was set out in the White Paper “The new NHS – Modern.
Dependable” which outlined strategies to reduce inequalities and to improve quality of
care by making local authorities stronger and to drive efficiency (Department of Health,
1998b). It was pertinent to increase public confidence in the NHS.

The inception of Primary Care Groups involved the joining of the primary and
community health services to a single organisation, the first time since the establishment
of the NHS in 1948 (NHS Homepage). The PCGs consisted of about 50 general
practitioners and community health professionals that served populations of around
100 000 patients (Majeed, 1999). The PCGs received unified, cash-limited budgets from
the Health Authorities (HAs) which allowed the PCGs to transfer funds between budget
areas to where money could best be spent (Majeed and Malcolm, 1999). GP practices
were thereby sharing the same pot of money and the intention with was to make GPs
accountable of their own spending as that impacted on neighbouring practices funds. To
make informed investments the PCGs had to monitor GP prescribing more closely
(Majeed and Malcolm, 1999). In 1999, PCGs could apply for PCT status.
1.3.1.3 Inception and description of the PCT organisation

The main difference between PCGs and PCTs was that PCTs are free-standing statutory bodies within the NHS whereas PCGs operated as sub-committees of their local health authority. PCTs had their own management boards and were fully responsible for the conduct of affairs; both in terms of economy and quality of care. Through the White Paper “Shifting the balance of power: the next steps” published in 2001, PCTs were made head of local services and took over many of the former HA functions. The purpose of this document was to place decisions closer to the population it served and to make primary and secondary care work closer. Currently, there are 302 PCTs in England each managed by an executive committee while their performance is monitored by a local Strategic Health Authority (SHA) (Department of Health Homepage). Mr Alan Milburn (the former Health Secretary) stated the purpose of PCTs:

“The whole point of PCTs is to have one organisation with one budget able to get the right balance of local services for the community. It is not then a question of primary versus secondary care. But how services can be reshaped in the best interests of patients.” “we use the specialists skills of GPs and of nurses to get a more optimum use of NHS resources for patients”

Each PCT has committees that manage different areas; the prescribing committee (also called the medicines management committee), the clinical governance committee and the finance committee. The management board is accountable for clinical services in the framework of governance and quality; however the PCT Executive Committee (PEC) often takes day-to-day decisions. The PECs are largely represented by GPs and nurses but pharmacists are gaining greater representation (Craig, 2003).

As well as driving local priorities outlined in Health Improvement Programmes (HiMP) and Health Action Zones (HAZ), the PCTs are required to have prescribing monitoring programmes in place such as a Prescribing Incentive Scheme (PIS) and educational outreach programmes for GPs. Locally developed formularies are encouraged and NICE guidelines are to be implemented by the PCTs. PCTs are assessed against targets through various monitoring programmes, one of which is the Star Ratings (implemented in 2002). Star ratings reflect the performance of the PCT against local and national targets; between zero and three stars are given. Star Ratings have been criticised as being unfair to PCTs that are situated in geographical areas with large health problems.
The local PCT sets an indicative prescribing budget for each practice based on factors such as previous year's prescribing and expected price increases of drugs. The PCT agrees the amount for next year's prescribing budget with the practice and informs the Prescription Pricing Authority (PPA). Age and gender of the patient population are major influences on prescribing and are used in budget calculations and allocations but may not be adequately adjusted for this (Rice et al., 2000). This allocation system is not much different from when the PCTs were PCGs but the PCTs have slightly greater local freedom around how money is spent. Central imperatives such as the implementation of NICE and NSFs are mandatory, thus total freedom is not achieved.

The current modernisation agenda of the NHS is promoted as the most radical and ambitious programme since its formation (Department of Health, 2000b). The success of this is largely dependent on the primary care sector, which is appointed the main organisational mechanism for driving the changes. Thus, much of the responsibility for improvements in public health has moved from a central to a local position; the PCTs.

1.3.2 Current changes in primary care and prescribing

1.3.2.1 Increased quality of health care

The quality of health care in terms of equality and safety of care had to increase to meet expectations from a more demanding patient population (Campbell et al., 2002). Of note is that the first national survey looking at patient experiences were undertaken in general practice in 1998 (Department of Health Homepage). The concept of clinical governance was first introduced in the White Paper “The New NHS” in 1997 (Department of Health, 1997). The clinical governance programme is defined as:

“A framework through which NHS organisation are accountable for continually improving the quality of their services, safeguarding high standards by creating an environment in which excellence in clinical care will flourish”

(Department of Health, 1999)

Current initiatives of clinical governance comprise clinical audit, quality monitoring and improvement, and also a wide range of education and professional development initiatives (WISDOM Centre Homepage). Prescribing is part of clinical governance through the NSFs and NICE guidelines. The main aim of the clinical governance programmes is to deliver clinically effective services and evidence based health care
Introduction

across the NHS. Stakeholders and GPs have however expressed resentment towards the increased workload that quality targets cause. In the report “Quest for quality” (2003) Sheila Leatherman reported that the biggest threat to quality improvements was setting too many targets. In the NHS consultation document “Standards for better health” (Department of Health, 2004) it was promised that the number of targets for NHS organisations would be cut down from 2005 and onwards. Very little was said about learning from experience in the health policy literature revised for this thesis. It could be proposed that the high number of targets is a way to focus attention on the future in order to detract from complaints of previous insufficiencies.

It is known within the NHS organisation that PCTs face enormous challenges in implementing clinical governance successfully; not only must implementation structures and processes be in place but quality outcomes designed and changes assessed to verify improvements. PCTs have a difficult task to both monitor and deal with poor performance while supporting GPs in the quality improvement process. There is limited evidence for the methods used in influencing clinical governance but there is evidence that combined multidisciplinary and educational approaches (e.g. continuing education, audit and research) can lead to behaviour change (Campbell et al., 2002).

The concept of quality of care was discussed by Grimshaw and Russell (1993) who said that quality standards had to be set in relation to what was achievable:

- Ideal standards: reflect "the best attainable under the very best conditions, where money and resources are unlimited"
- Optimal standards: are "the best which conscientious practitioners can achieve under (normal) working conditions with the resources that are available to them"
- Minimal standards: are "those below which care should not be allowed to fall without causing the possibility of harm to patients"

Grimshaw and Russel's insights may be difficult to present to the public as clearly ideal quality standards are not attainable; resources are not unlimited. ‘Quality’ in the context of health care has been described as follows;
"Quality in health care is the total package of features and characteristics of a health care service or product, and the way in which it is provided, that bear on its ability to satisfy agreed needs of the consumer and the agreed requirements of the purchaser within constraints imposed by professional judgement, at lowest cost, and whilst minimising waste and losses" (Morris, 1995)

Another concept of quality was launched in The White Paper, “A First Class Service” (1999): “Quality is not an add-on...it must be an integral part of ...services”.

Low prescribing expenditure is often priority but good quality prescribing can (and often does) cost more (Audit Commission, 2003). Stakeholders need to decide how much quality is allowed to cost and set their targets accordingly. In this debate it should also be remembered that while high quality care is expensive, poor quality care is itself costly (Department of Health, 1999), for example if tests need re-doing due to loss of data or a patient is admitted to hospital due to adverse drug effects which could have been avoided in medication review.

In a recent report, it was concluded that most doctors have negative views on clinical governance as they felt clinical governance was management driven and did not incorporate the clinical variations that the doctors have to deal with (Degeling et al., 2004). Degerling and colleagues said that clinical governance was intended to work from the bottom up of management structures but that this was not the case when investigating practice. They concluded that clinical governance had become an isolated unit where quality targets were discussed at management level only.

A recent publication queries whether the current clinical governance model is the best way to improve quality of care (Whitty, 2004). This is not only true for primary care; managers in secondary care perceived more progress in areas concerned with quality assurance than with quality improvement (Freeman and Walshe, 2004). Campbell and colleagues (2002) conducted interviews with 50 stakeholders in 12 PCTs to identify the barriers to clinical governance. It was thought that the means by which to influence general practice were weak and that there was a lack of staff, time and money to do so. The findings concluded that without the support from practices the implementation of the clinical guideline framework would not be successful, the pace of change may be too fast and practices may be at different levels in the delivery of quality of care.
Practice staff were suspicious that quality assessment was associated with blame. Of course governance is a laudable initiative but implementation in general practice seems to require cultural and organisational change, as well as support from the PCTs.

1.3.2.2 Barriers to implementing change

It was proposed that real improvement comes from changing systems rather than change within systems (Berwick, 1996). The distinction between the two could however be difficult to make; arguably the formation of PCTs was a system change, but when looking at the NHS as a whole the formation of PCTs was merely a change within the system. Berwick pointed out the difference between improvement and change; “not all change is an improvement but all improvement is a change”.

Shekelle (2002) discussed four reasons that physicians don’t fully support change programmes even when they are set to improve quality of care: 1) a lack of agreement between the physicians and the innovators of the quality measures; 2) a concern from the physicians that quality improvement programmes can be used as a tool of blame; 3) the fact that new programmes are added to an already busy schedule without giving additional resources for implementation; and 4) that there are no role models nor evidence for how, or that the improvement programmes will work. These issues are further discussed in Part II.

1.3.2.3 The General Medical Services contract

The most recent major policy change in general practice was the introduction of the new General Medical Services (GMS) contract in April 2004. The contract was drawn up in an effort to retain and attract more staff to the GP profession which was seeing an increasingly unhappy and declining workforce. Prior to its approval in April 2003, it had met opposition by the British Medical Association (BMA) and negotiations were halted (The Guardian, 20/06/03). It is still too early to judge how the new contract achieves its goals.

The GMS contract is built on financial incentives and promotes multidisciplinary working, and greater responsibility and freedom for the practice for example; the practice can now set their own service provision targets according to a 3 year budget plan. The contract has addressed GPs’ workload and practices are allowed to opt out of
optional service provision and out-of-hour services. This is intended to make, or perhaps force, GPs to team play with other professions, encourage greater responsibility of quality improvement. Services are divided into essential and optional services that are reimbursed according to performance against targets; GPs’ payment is based on achievements related to quality indicators and thus quality of care is a factor determining pay. This is positive for patients, provided that GPs raise their stakes to provide increased quality care. The new contract could potentially fragment care when doctors opt out of services as patients then may need to seek care elsewhere. The contract has implications for small practices however, in that it may be difficult for them to provide optional services.

The Quality and Outcomes Framework (Q&OF) outlines points for improvement of care within the new contract. In an evaluation of the Q&OF, the increased costs of statin use alone would contribute to a 5.6% increase in prescribing costs (Prescribing Support Unit, 2004). It should be remembered that annual average increase in prescribing cost is already 10-12% and the costs for statins would be additional to those. Strained prescribing budgets could contribute to a loss of trust in the new contract; national policy has to be re-thought so that increased prescribing is appropriately targeted and supported (Durden, 2004).

1.3.2.4 Pharmacists as prescribers
The pharmacy profession is currently undergoing fundamental change. After centuries of taking a ‘backseat’ within health care, there is now opportunity to develop. The Department of Health document “Pharmacy in the Future” (2000) sets out the opportunities for pharmacists and how they can contribute to increased quality of health care as outlined in the “NHS National Plan” (2000). Time is short for pharmacists to show what they are capable of and to take on new responsibilities within the NHS; unless they demonstrate their value, other HCPs may ‘fill the gaps’.

Supplementary prescribing is one of the recent ways in which pharmacists can regain their control of their area of expertise; drugs (Harding and Taylor, 2002). Harding and Taylor meant that pharmacists must develop strategies to make themselves regarded as professionals that are ‘needed’ by the society. Medical staff shortages may have contributed to the introduction of new roles for nurses and pharmacists (Wilkin, 2001)
but as there are also shortages of pharmacists and nurses, this suggestion is doubtful. Harding and Taylor (2002) continues that efforts must be maintained as pharmacists may otherwise again, as previously shown by history, fall outside the core of health care. Spokespersons from the Adam Smith Institute Homepage highlighted the urgent need for pharmacists and called prescriptions an “information free zone” referring to that once a prescription has been issued no one is assessing the needs of the patient in terms of medicines management. It was suggested that doctors should stop issuing prescriptions altogether and hand over that role to pharmacists (The Adam Smith Institute Homepage).

**The new pharmacy contract**

Approximately three-quarters of all medicines prescribed in primary care are repeat medications. Pharmacists have been put forward to take over the responsibility to issue repeat prescriptions in order to ease the burden on GPs. This has been set out in the new pharmacy contract for community pharmacists and is currently under negotiation but to be instated in January, 2005. The contract has similarities with the GMS contract in that payment is connected to service provision. Community pharmacists will then be required to supply repeat prescriptions and after training also be engaged in medication reviews and prescription intervention services. The new contract opens possibilities to work as supplementary prescribers in a GP practice.

**Supplementary prescribing**

The definition of prescribing is "to order in writing the supply of a Prescription Only Medicine for a named patient" as defined by the Medicines Act, 1968 (Department of Health, 1999). In 2001, the Health and Social Care Act made it possible to extend rights of prescribing to other professionals than doctors. The policy framework for supplementary prescribing by pharmacists and nurses was completed and came into force in April, 2003. The framework was incorporated as a means of increasing GPs’ job satisfaction and providing a better service for patients (Department of Health, 2000a).

Supplementary prescribing is described by the RPSBG as a partnership between a medical practitioner (the independent prescriber) and a pharmacist (the supplementary prescriber). The independent prescriber establishes the diagnosis of the patient and
initiates treatment where after the patient is referred to the supplementary prescriber who monitors and prescribes new supplies of medicines. The pharmacist must undergo additional education and before that have an established partnership with a GP practice which is approved by the local PCT. The patient must also agree to this service route. Expansion of the service can potentially be halted by the requirement to have a link with a practice prior to undertaking the education or if patients do not accept the new route of services.

The first prescription was written by a female pharmacist in Scotland in April 2004 who ran coronary heart disease clinics. The future looks towards extending these to full independent prescribing for pharmacists who would then be able to care for patients with chronic and acute illnesses. It is yet too early to evaluate the effect of pharmacist prescribers. Supplementary prescribing and the new pharmacy contract is likely however to have implications for PCT prescribing management; as these new prescribers enter the prescribing process the PCT will have a greater number of prescribers to monitor and support.

1.3.3 Reasons for influencing and controlling prescribing

GP's' prescribing costs have been rising more quickly than other spending on health care services (Audit Commission, 2003). The reasons for an increased drug bill are discussed in section 2.1 but in addition to this an increasingly wide range of conditions are treated, some of which demands preventative drug therapy, with the consequence that a greater number of people are treated (Adam Smith Institute Homepage). But prescribing management also concerns quality of prescribing; managers have to balance costs against quality and what is available in terms of drug therapy may not be economically feasible (section 1.3.2.1). The concepts of quality and costs in terms of drug therapy are discussed below.

1.3.3.1 Good prescribing

There is no precise definition of what constitutes good prescribing. A commonly cited definition is that good prescribing it should be “appropriate, safe, effective and economic” (Parish, 1973). Barber (1995) suggested that the term appropriate was too broad and unspecific, and safe and efficient definite terms which were not sensitive enough to distinguish between today's drugs. As there are now many types of economic
evaluation; economic efficiency, utility, and benefit, economic as a sole term becomes inappropriate. Rather than getting trapped in the definitions of good prescribing Barber suggested focusing on what good prescribing comprise: “to maximise effectiveness, minimise risk, minimise costs and respect patient choices”. It is of less importance whether it is Paris’ definition or Barber’s approach that drives efforts towards ‘good prescribing’.

Another concept for good prescribing is ‘rational prescribing’. Within the concept lies that drug spending is targeted at patients who will benefit from the treatment and that the most cost-effective treatment option is used without compromising patient care. It was recognised that rational prescribing can lead to higher cost but the Audit Commission (2003) said that rational prescribing is more than just limiting costs.

Of greater importance than mere definitions is that markers of ‘good prescribing’ are available so that ‘good prescribing’ can ultimately be provided. Tully and Cantrill (2002) initiated work on developing a tool for routine assessment of appropriate prescribing. The issues for assessment were grouped into domains that comprised: indication and drug choice, effectiveness, risks and safety, dosage, interactions, practical use, and monitoring. Prior to this Cantrill and colleagues (1998) had developed a set of nine indicators of appropriate prescribing of long term medication for primary care patients (Box 1). The indicators were consented by prescribing experts’, community pharmacists’ and GPs’. These indicators were at the time the only tool to investigate the appropriateness of long term medication in a structured way. The authors admitted however that the nine indicators were too labor-intensive to be used in routine clinical practice but that they had potential for research. Today, there are still only the medical records to which these indicators can be applied in order to investigate appropriateness of prescribing for an individual patient.

Box 1. The nine indicators for appropriate prescribing.

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<table>
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<tr>
<td>1.</td>
<td>The indication for the drug is recorded and upheld in the BNF</td>
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<tr>
<td>2.</td>
<td>The reason for prescribing a drug is recorded and valid</td>
</tr>
<tr>
<td>3.</td>
<td>Compared with alternative treatments in the same therapeutic class, which are just as safe and effective, the drug prescribed is either one of the cheapest or a valid reason is given for using an alternative.</td>
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<tr>
<td>4.</td>
<td>A generic product is prescribed if one is available</td>
</tr>
<tr>
<td>5.</td>
<td>If a potentially hazardous product is prescribed, the prescriber shows knowledge of the hazard</td>
</tr>
<tr>
<td>6.</td>
<td>If the total daily dose is outside the range stated in the BNF, the prescriber gives a valid reason</td>
</tr>
<tr>
<td>7.</td>
<td>If the dosing frequency is outside the range stated in the BNF, the prescriber gives a valid reason</td>
</tr>
</tbody>
</table>
8. If the duration of the treatment is outside the range stated in the BNF, the prescriber gives a valid reason.
9. Prescribing for hypertension adheres to the evidence-based guidelines in the BNF.

It is clear from the indicators that the BNF is central to prescribers and pharmacists. In continued work doctors were interviewed about reasons for diverging with BNF advice (Cantrill, 2000). The study demonstrated both intentional and unintentional reasons for non-adherence to the BNF. Sometimes GPs found it difficult to apply guidance due to factors such as individual patient needs; patient preference or patient resistance to use a certain drug was commonly mentioned by GPs as a reason for inappropriate prescribing (Cantrill et al., 2000). The GPs had at times developed their own experiences of a certain drug that diverged from BNF recommendations (Cantrill, 2000). Inappropriate prescribing sometimes occurred when taking over hospital-initiated prescriptions or when therapy was started a long time ago and were no longer considered appropriate. In other cases the GPs were unaware that their prescribing was outside the BNF recommendations. In 15% (36) of the cases the prescriber disagreed that prescribing was inappropriate or gave unqualified reasons to a particular choice (85;37%) (Cantrill et al., 2000). These factors are further discussed in section 1.4.8.

1.3.3.2 Prescribing costs

On average, a PCT spends £18 million on prescribing which accounts for about 16% of their total expenditure (Audit Commission, 2003). £6.8 billion pounds was spent on GP prescribing in 2001/02 which accounted for about 10% of NHS expenditure (Department of Health, 2002). This is 10.7% or £540 million more than in 2000/1, and almost one-half (£240 million) was accounted for by rises in just four of the 200 sections of the BNF (Audit Commission, 2003). It was estimated that a considerable proportion of the increase in cost originated from new recommendations in NSFs and NICE guidance; respectively 7% and 25%. Although the PCTs increased their drug budgets for 2002/2003 by 10%, the Audit Commission (2003) said that this allocation would still not be enough to absorb increasing costs which were estimated to 12%. Two per cent may seem small but when it comes to the actual figure: £110 million, it calculates that each PCT have to take an extra £360k from other budgets.

The prescribing budget for each PCT is set by the PPA. The sum was previously calculated on what had been received in the past. A new formula is currently being
implemented that bases allocations on the size, demographics and illness of the patient population that is served by the particular PCT. The new allocation scheme looks to increase equality in health care between geographic areas. PCT Prescribing Advisors allocate shares of that money to each GP practice. The practices budgets are only ‘indicative’ which means that an over-spending practice will receive additional money from the PCT to balance the books. It should be acknowledged that sometimes the cost is incurred outside the PCT; patients on hospital initiated drugs that are shifted to primary care can cause an economic burden for PCTs. There has been a debate over who should take the costs for prescribing such drugs and joint primary-secondary care prescribing committees have been advocated.

Evidently, the PCTs have no forceful means by which they can control GP prescribing costs directly. This structure has driven the inception of prescribing initiatives in efforts to control, as well as support, GP prescribing. With such budget structures controlling prescribing costs had to be part of each GP’s responsibility (Majeed, 1999). In fact, GPs have been held to largely control the costs of the whole NHS; their decisions to refer a patient to secondary care, to send them back home or to prescribe drug treatment have different cost implications (Parish, 1973). Therefore, prescribing costs should be considered in terms of opportunity costs; a patient may be able to stay at home due to advanced drug therapy (that may costs more than ‘basic’ drug therapy) instead of going in to hospital and thus, there may be a total saving of health care resources even if drug costs have increased. A week in hospital costs on average £1,400 for one patient while the average prescription costs £9 (The Association of the British Pharmaceutical Industry Homepage). Prescribing, although costly, has been recognised as a highly cost-effective activity but has been associated with an enormous waste of money due to; inappropriate prescribing, inefficient prescribing systems and poor patient compliance (Adam Smith Institute Homepage). Whilst interesting, further discussion and investigation of opportunity costs was outside the remit of this thesis.

1.3.4 Supporting and controlling prescribing

Prescribing support can be defined as the use of additional professional input into one or more elements involved in the prescribing process. It has the overall objective of promoting high quality and cost-effective medicine use and of improving pharmaceutical care of patients. The current aim is to release time from repeat
prescribing for GPs to focus more on preventative care (Audit Commission, 2003). Political interventions for supporting and controlling prescribing costs are presented next while other types of interventions are presented in Part II.

1.3.4.1 Cost cutting interventions
Different governments have used various strategies throughout the years to cut down NHS drug costs. These have included implementing prescription charges (introduced in 1952) whereby patients had to pay a fixed amount for each dispensed item; the Limited List launched in 1985 which excluded some drug groups from being reimbursed on NHS prescriptions and the fundholding scheme implemented in 1990 (section 1.3.1.2). These interventions all decreased government expenditure but not to the great extent as expected (Ryan and Yule, 1993). Another intervention that has been utilised by the Government is to shift Prescription Only Medicines (POM) to Pharmacy sale medicines (P) where the cost of the drug is borne by the patient. Obviously, only certain drugs are suitable for P such as paracetamol and acetylsalicylic acid. This action however, does not prevent a P medicine from being prescribed by the doctor.

1.3.4.2 Increased funding
Increased funding is another way in which increased costs can be absorbed but increased funding does not automatically lead to increased efficiency. In the last decade efficiency of care is only rising slowly as a result of the increased funding within the NHS and there are concerns that the additional funding has been absorbed by increased salaries and new drug and treatment costs rather than in increased output of healthcare (Healthcare Commission, 2004). The percentage spent on salaries and wages of the total NHS budget decreased from 63% to 59% between 1999 and 2003 (Department of Health Homepage) which meant that either wages were cut, personnel reduced or the total budget increased. The total budget increased from £27.3M to £44.2M while at the same time spending on salaries increased from £17.1M to £25.9M. Thus, the argument of additional funding being absorbed in increased wages seemed true.

The Healthcare Commission (2004) also said that “It is not possible to measure directly the benefit of each extra pound spent on healthcare”. The reason for this is that there are no consistent systems that follow up a patient’s treatment to see if better health was achieved with the additional funding. Instead, measures of NHS productivity are used.
Number of operations and patients seen in clinics are taken as a ratio of the increased funding as a measure of increased output per increased spending. Health however, can not be measured in this way. Programmes that improve health e.g. smoking cessation are not currently incorporated in the productivity measures and avoidance of referral is counted as ‘non-activity’ and in not incorporated in the calculations. In fact, non-referral is counted as decrease in productivity in the current system. The Secretary of State for Health 2004 John Reid said in a presentation to GPs that “The whole point of an effective health care system must be to reduce the numbers of people who have to go to hospital...”.

1.3.4.3 Absorption of the increased costs

Prescribing costs could be kept down or absorbed by the following key players; the GPs, the patients, the pharmaceutical industry and the Government. By placing the responsibility on PCTs to manage the drug bill, the Government has appointed GPs to take on the cost reduction. The GP in turn, must often negotiate prescribing with patients who demand a prescription. It could be proposed that most patients (who are also taxpayers) would not be interested in paying for drugs that would not help their disease. However, there is an asymmetry of information between the doctor and the patient; patients may actually not know that the drug they demand could be of no benefit to them (e.g. patients that ask for antibiotics for viral infections). This asymmetry of information (and perhaps also the asymmetry of beliefs) could potentially be solved by educating patients about the costs and benefits of drugs. The situation around cost conscience is however further complicated by the fact that 85% of the patients do not pay for their prescriptions. These patients may not know what drugs really cost (Senior, 2002) and may therefore have low motivation to reduce costs; 23% of a patient sample refused to switch drug treatment based on financial motivations (Russel et al., 2000). By replacing the flat fee prescription cost with patient co-payment systems where the patient pays a proportion of the drug cost could potentially make patients absorb part of drug costs and make them more responsible to keep costs down.

In this discussion, nothing is said about the motivation of GPs to keep costs down - and in reality there is little motivation for the GPs to do so. The PCTs can communicate reasons to contain costs, support GPs in doing so, but the PCT cannot themselves control prescribing expenditure.
1.3.5 PCTs’ ability to deliver on GP prescribing

The NHS Plan states that "the development of primary care services is a key to the modernisation of the NHS" (2000b). The agenda for primary care includes assessment of local health needs, planning and delivering an improved quality of care. The PCTs are encouraged to form new partnerships with the local community and the local government and to take a leading role within the NHS. To achieve this, substantial cultural change is needed which involves skill-sharing between disciplines and care organisations in the presence of patient voices (The Department of Health, 2000b). The government does not however explicitly describe how local health care providers should implement changes, simply that change is required. This leaves a lot to individuals within the PCTs and there is no support at hand when things go wrong, e.g. when improvement targets are missed and budgets over-spent.

The NHS Confederation Report “PCT management capacity” (2001) concluded that the PCT management capacity was an obstacle in delivering their core functions. There were doubts that the PCTs would manage the rapid changes demanded by authorities and the public and it was feared that only short-term initiatives would be enacted (Campbell et al., 2002). The All Party Parliamentary Group (2002) stated that in order for PCTs to succeed on priorities they must be given flexibility and a ‘sufficient’ budget to undertake these priorities. Since April 2004, the PCTs control 75% of the total NHS budget but whether this proportion suffices to drive the full primary care agenda is unknown (Department of Health Homepage).

There are many obstacles around organisational change, one of which is the creation of new bodies. Only two in five mergers of organisations are successful as one of the organisations is often unable to absorb the other (Levick, 2001). In addition, the optimal size of a PCT has been debated and warnings have been issued that the primary care organisations may become like the health authorities and secondary care; inflexible and hierarchical (Levick, 2001). A larger organisation may however be able to deliver greater equality and be more able to cope with the increasing agenda set by the Government, like clinical governance and Continuous Professional Development (CPD). But a larger organisation may not necessarily give better care; and can not guarantee an increased efficiency and effectiveness of care (Levick, 2001). It was
concluded that there is no one right size for a primary care organisation but that it all depends (Walshe et al., 2004).

The Audit commission (2004) investigated 9 PCTs how they were coping with expectations of being proactive commissioners of primary care and it was said that some PCTs were “ill-prepared” and that capacity and ability varied. The Audit Commission also said that PCTs must increase their knowledge about local practices and improve their understanding for differences between practices in order to provide adequate support.

1.4 PART II

1.4.1 Introduction to means and methods to influence prescribing

It may be especially difficult to influence change in general practice as GPs have historically been self-contained and freed from central regulation. Due to their independent position and the reimbursement system for their services GPs have always been involved in health politics and as a large and widespread profession, they exert substantial pressure on the Government. The shift in balance from secondary towards primary care meant that GP’s prescribing budgets came under control of the PCTs. This was done in efforts to control spending ‘nearer to the front-line’ where drugs are prescribed.

Freeman and Sweeney (2001) reported that GPs’ resistance to change was influenced by their personal and professional experiences, the relationship with the patient and the perceived tension between primary and secondary care. Doctors’ resistance to implement new quality programmes was widespread within the UK, as well as internationally (Freeman and Sweeney, 2001). Paradoxically, there is little support that physicians would deny the delivery of best possible care for their patients. Shekelle (2002) pointed out four reasons to why doctors didn't enthusiastically implement new programmes to increase quality of care:

1. Physicians may not agree with the quality criteria being measured. It is difficult to construct fair quality measurements but even if there were perfect measurements of quality the author still thought there would be resistance amongst doctors.
2. The doctors saw 'quality programmes' as an opportunity for authorities to target individual physicians and to blame them for inappropriate care. Doctors have always been the 'captain of the ship'. The NHS is trying to shift the 'culture of blame' to one of sharing and learning.

3. Doctors were asked to participate in new programmes on top of their existing responsibilities. By providing adequate remuneration to the physician the problem may partly be helped.

Even if the above barriers were solved the author still thought there would be resistance until they had seen the quality improvement programmes work in practice:

4. The physician needed proof that the model worked, they needed role models. Until a new model has been tested it is not possible to know how a programme will work; each new intervention needs its pioneer. Shekelle (2002) believed that quality measurements and improvement will become as commonplace in health care as within other services in society and suggested financial 'stick and carrot' approaches for PCTs to help reaching the goal of continuous quality improvements. Wilcock and Lewis (2002) reported that continuous quality improvement was emerging as an academic discipline. Influencing change of clinical practice is a relatively new research area in the UK. In 1995 there was still a lack of UK-based studies addressing change of practice (Oxman et al., 1995).

It was recognised that changing existing prescribing habits was very difficult which was why it was essential that medical students developed appropriate prescribing patterns on leaving university (WHO, 1994). While it may be difficult, if not 'too late', to change prescribing of today's practitioners, the responsibilities of the PCTs prompted them to try.

Weiss and colleagues (1996) investigated GPs' perceptions around prescribing decisions and what effect that had on actual prescribing. The survey comprised four themes in relation to prescribing decisions i) GPs' sense of burden in providing health care, ii) GPs' views on financial constraints and incentives, iii) the use of a prescription to cope with clinical workload and iv) GPs' perception of demanding patients. Only the respondents' concern about the potential negative effects of financial pressures upon medical decisions was significantly related to prescribing and it was found that GPs
Introduction

concerned about financial pressures prescribed less generically, had higher practice mean costs compared with the average GP in the Health Authority and issued more prescriptions overall.

In later work (Hassell et al., 2003) it was concluded that UK doctors take a firm opinion against patients abusing the NHS system and view prescribing costs to the health system as important as prescribing costs to the individual patient. GPs’ had developed a number of strategies to reduce NHS expenditure which was demonstrated in the study by Weiss and colleagues (2004). In that study GP’s were compared to nurses in how they handled patients’ expectations of receiving an antibiotic. It was found that GPs were well - and more than nurses - aware of patients’ influence. GPs were more likely to report that the patient expected an antibiotic than nurses (72% of 181 versus 13% of 291, p< 0.001) but were less likely to report that an antibiotic was indicated than nurses (88% of 136 versus 97% of 194, p< 0.001). GPs were likely to report that the patient expected an antibiotic when the patient reported wanting a prescription (60% of 68, p= 0.05) and to report that the patient expected an antibiotic if the patient thought an antibiotic would be beneficial (62% of 68, p= 0.001). Interview data in a study by Weiss and colleagues (1997) had explained that the prescription was used as the doctor’s problem-solving tool in patient consultations. The authors concluded that such use of the prescription may not conform to the definition of rational prescribing but instead applies with rational behavior of the GPs’ in the context where prescribing occurs.

A range of methods have been used in efforts to influence health care practice; educational material, conferences, outreach visits, local opinion leaders, patient mediated interventions, audit, feedback, reminders, marketing and local consensus processes, but it was concluded in a review that interventions will at the best only have limited effect (Oxman, 1995). Many methods have been tested out in research environments as ways to implement an intervention, but of those tested only about half have proved effective in changing prescribing behaviours (Gill et al., 1999). Furthermore, no method was in itself advantageous over the other (Budd and Dawson, 1994) and multifaceted interventions gave the best effect (Gill et al., 1999; Oxman, 1995).
The Audit Commission (2003) listed some factors that have been shown to influence GPs' prescribing choice. Most of these factors are discussed throughout the rest of this chapter.

- National policies such as NICE guidance, NSFs and national support mechanisms like the Prescribing Support Unit (PSU), National Prescribing Centre (NPC)
- Medical factors such as the hospital consultant's view, treatment protocols, medical evidence
- Economic factors such as cost of drugs, pharmaceutical company representatives and social deprivation of the patient
- Local policy issues such as the local formularies from the PCT and prescribing incentive scheme targets
- Social factors such as higher patient awareness of new treatments and increased patient expectations

1.4.2 Formularies and clinical guidelines

Formularies are in essence a list of preferred drugs within each therapeutic class. The perhaps most well known and respected formulary in the UK is the British National Formulary (BNF) which was established in 1949. The BNF lists all licensed drugs on the UK market with the indications for each drug. There are close similarities between clinical guidelines and formularies and there are no strict distinctions between the two. As defined by the National Institute of Clinical Excellence (NICE), a clinical guideline is a "recommendation on the appropriate treatment and care of patients with specific diseases and conditions" but many different definitions are used in published literature. An American definition read: "systematically developed statements to assist practitioner decisions about appropriate health care for specific clinical circumstances" (Field and Lohr, 1990). Clinical guidelines may give additional advice on treatment (e.g. information regarding diagnostics, screening tests, preferred medical and surgical services, hospital stay) while specific drug recommendations may be left out. Since 1990, the Department of Health have encouraged PCTs to develop local formularies or guidelines in order to streamline prescribing for increased quality and control of costs.

These recommendations seemed to have been taken on board; and there is now a 'guideline overload' within general practice. In a sample of 65 practices in Cambridge,
UK, Hibble and colleagues (1998) collected a total of 855 guidelines averaging 13 guidelines per practice. About 60% of them had been produced locally and the rest nationally. Many of the guidelines were not dated when they were created (38%) which was a cause for concern as recommendations change with therapy improvements. Published literature says it is essential to review and update guidelines (Thomson, 1995) for the benefit of doctors and patients.

Apart from external advice, GPs normally have a unique and personal drug formulary in their minds which contributes to their decision on whether and what to prescribe (Carthy, 2000). NICE recommended that the clinical guideline should sit alongside but not replace the knowledge and skills of experienced health professionals (NICE Homepage).

In theory, the quality of care should be improved by fully implemented clinical guidelines but practical advice on how to go about this is sparse. A Bandolier review (2002) found no evidence that formularies had an effect on cost or quality of care. Clinical guidelines offer no 'magic bullets' to health care problems but can be effective when scientific evidence can provide an answer. For changing behaviour, clinical guidelines may do little; beliefs and values are principal components for change in health care (Woolf et al., 1999).

### 1.4.2.1 NICE guidelines

The National Institute of Clinical Excellence (NICE) was set up as a Special Health Authority for England and Wales in April 1999 with the purpose of providing patients, health professionals and the public with authoritative, robust and reliable guidance on current 'best practice'. Recommendations of which drugs should be reimbursed under the NHS is also part of NICE’s duties. NICE produces guidelines on topics selected by Government Departments and their submission of new evidence is speedy – perhaps too speedy. Their working process and ability to produce high quality guidelines was assessed by the House of Commons in 2002, which highlighted that NICE withheld much of the clinical evidence they received from the pharmaceutical industry due to clauses of confidentiality. In order to maintain credibility, transparency of the development process needs to be revised (Kmietowicz, 2003). The House of Commons recommended that NICE should give advice on groups of drugs rather than on specific
drugs to avoid suspicion of commercial bias. During the time of this critique the WHO concluded that (2003):

"NICE has developed a well-deserved reputation for innovation and methodological development that represent an important model for technology appraisals internationally" (WHO, 2003)

A study on the influence of NICE guidelines on GPs prescribing concluded that influence was sparse if NICE guidelines were used alone but that influence increased when NICE recommendations was supported in other publications or was in line with GPs' personal experiences (Warten, 2004). No significant influence on GP prescribing was seen if the NICE guidelines differed from other sources or if the recommendation was out-of-date (Warten, 2004). PCTs must implement advice from NICE within three months of publication; the end-points of implementation are neither established nor advised upon.

1.4.2.2 National Service Frameworks

The National Service Frameworks (NSFs) were set up to reduce unacceptable variations in care and standards of treatment received by the patients (Department of Health, 1998a). The work began in 1999 to define national standards and service models for major areas of care and disease groups, for example care for older people, diabetes and coronary heart disease. The purposes with the NSFs were to:

- Set national standards and define services models for a specific service or care group
- Put in place programmes to support implementation
- Establish performance measures against which progress is measured

(Department of Health, 1998a)

The Audit Commission (2003) showed that one of the most significant factors driving the increases in drugs spending was the implementation of NSF for Coronary Heart Disease. The spending on lipid regulating drugs including statins and antihypertensives had increased 33% and 18% respectively between 2000 and 2002. The Audit Commission (2003) also found a large variation between PCTs in the prescribing of these drugs (ranging from 43% to 184%) and that the appropriateness of increased
prescribing of statins was not evaluated. Such is an important task for prescribing advisors in order to assure appropriate prescribing outcomes from the guidance. NSFs and NICE guidance seemed to be at the forefront of pharmaceutical advisors' minds:

"Where there is clear guidance from NICE or an NSF which gives specific advice, then that is the biggest driver for prescribing” (Buissen, 2002)

1.4.2.3 Local formularies and guidelines
Considerable amounts of money have been invested by the Government to develop and implement local formularies and guidelines. Literature on these processes is abundant and recommends that developers are explicit in the methods they use, especially how expert opinion is obtained. It is widely held that guidelines should build on evidence to be useful when practicing evidence-based medicine (EBM). EBM is the “conscientious, explicit and judicious use of current base evidence in making decisions about the care of individual patients” (Sackett et al., 1996). EBM is important to the NHS in order to identify the most cost-effective and efficient methods to care for patients (Irani, 2001).

In a randomised control trial by Watson and Gunnel (2001) postal distribution of guidelines or educational outreach alone did not change GPs’ prescribing to a great extent but when a combination of the two was used some change could be measured. The baseline prescribing was however satisfactory in the study practices which may have explained why a major change in prescribing was not seen. Guidelines have been shown to influence and improve clinical care but it is less certain how well they influenced everyday practice (Cantrill, 2000). The author did not however explain why the influence of daily practice was uncertain.

Moulding and colleagues (1999) described requirements for success which included; assessment of readiness to change and specific barriers to change, but gave little advice how this should be investigated and what should be done when barriers were found. If clinicians were not ready for change, what then should the PCTs do to meet national imperatives? Such critique is directed towards many of the published authors; thus there is a call for more precise advice on how to work with formularies and guidelines. Potentially, the use of a combination of quantitative and qualitative methods could explain the complexities of prescribing change and aid in building a tool for change.
Prescribing indicators and the prescribing database

Indicators are the basis for many measures that the NHS uses to measure targets and to assess services; "Indicators are explicitly defined and measurable items referring to the structures, processes or outcomes of care" (Campbell et al., 2003). There are indicators that measure different types of activities such as access to service, service provision (where prescribing indicators are grouped within) and prevention of disease. In this thesis, prescribing indicators are of greater focus than other indicators.

Prescribing indicators is the collective name of markers used to measure GP performance of prescribing. Prescribing indicators exist in the Prescribing Analysis and Cost (PACT) database and in Prescribing Incentives Schemes (PIS) to mention a couple. The Prescribing Support Unit, recommended on the behalf of the Prescribing INdicator Group (PING) that prescribing indicators should be:

- Based on clinical evidence
- Accepted as relevant and useful
- Based on reliable, accurate and comparable data
- Able to demonstrate changes in prescribing behaviour
- Appropriately weighed to allow comparisons between health practices or health authorities, and to allow changes over time.
- Able to discriminate between more or less desirable prescribing behaviour

( Prescription Pricing Authority Homepage )

All dispensed prescriptions in England get registered in the PACT database which is maintained by the PPA. It is the second largest database in Europe (after NATO) and probably the largest medical database in the world (personal communication PACT course leader PPA 11/07/02). Each quarter all GPs receive the so called PACT Standard Report which compares their prescribing to other practices within the PCT and in the region.

Through this database comparisons of prescribing can be made between PCTs, and between practices or between individual GPs within a PCT. The database has different numerators and denominators for investigating cost and volume in prescribing (section 3.3.3). The PACT database does not contain any specific patient information and
therefore nothing can be said about the appropriateness or quality of prescribing with
this prescribing data alone. The PACT database has however been used for assessment
of appropriate prescribing in combination with other measures. Britten and colleagues
(2003) used two indexes (Medication Appropriateness Index and the Prescribing
Appropriateness Index) to measure the appropriateness of prescribing at the individual
patient level in conjunction with the PACT data of individual prescribers. Patients and
prescribers were contacted for information on the encountered prescribing decision and
it was concluded that only 41% of the prescriptions were wanted, necessary and
appropriate, which suggested that there was room for a reduction in prescriptions. The
collection of data was cumbersome and thus advancement in assessment of quality of
prescribing was called for.

Campbell and colleagues (2000) said that unpublished evidence concluded that PACT
data are more valid for cost minimisation than for assessing quality. A set of proxy-
indicators for quality has now been incorporated in the ‘Toolkit database’ (section
3.3.3) but patient-linked data was not available during the time of this project.

1.4.4 Prescribing Incentive Schemes and financial incentives

The Prescribing Incentive Scheme (PIS) is a set of audits in selected clinical areas in
which GPs are invited to participate. Each PCT is obliged to have a PIS every year but
practices are free to opt out of the schemes. The PIS is developed and evaluated locally
and its contents are often a mix of local priorities and national imperatives. For best
effect, a set of issues have been suggested; the PIS targets should be developed together
with local prescribers, reflect local needs, promote cost-effectiveness and high quality
prescribing, be linked with clinical governance issues and NICE guidelines and cover a
wide therapeutic area without containing a too diverse set of targets (Smy, 2001). The
main aim of these audits is to give GPs feedback on their prescribing and provide
opportunity to improve and compare their prescribing with peers in neighboring
practices. Importantly, the scheme also serves as a pressure instrument to keep
prescribing costs down within the PCTs.

PISs have reward money attached to each audit within the scheme (often called
financial incentives or incentive money) and are given to practices that manage to fulfil
audit targets. The reward money can only be used within the practice to improve
services of care, such as i) to buy additional equipment for the treatment of patients, or furniture, or computers; ii) for initiatives to improve prescribing or iii) for health education and investments according to the PCT Investment Plan. The money cannot be used for services or equipment such as; existing staff employment costs, paying off mortgages, or buying medicines or hospital services.

Research on PIS has focused around the financial incentives and established that rewards must be 'high enough' to act as an incentive and that all targets should be set within reach of all practices so that no one is discouraged. Findings showed that doctors were responsive to financial incentives (Bloor and Freemantle, 1996) and that money has been shown to override expertise (Handy, 1999). Financial incentives were however not considered capable to change large groups over time (Ashworth et al., 2000).

PISs have started to incorporate quality measurements of prescribing (Ashworth et al., 2002a) and move away from budget targets as many 'better' prescribers overspend and thus don’t get their incentive money (Ashworth et al., 2002b). Ashworth and colleagues (2002a) showed that there was no difference in overspending of prescribing budgets in the study PCGs and how many of their practices had received incentive money. This signals that incentive pay was an inefficient way to control prescribing budgets.

In a study by Baker and colleagues (1995), lack of time was the prime factor for withdrawal from clinical audits. Participating practices were likely to be larger, have a partner who was a member of a college and to have discussed participation with the practice. There was also a relationship between practice size and discussion of participation; larger practices had more often engaged in discussions. Participation and completion of clinical audits were also affected by GPs perceptions about the group that constructed the audit; whether the group was viewed positively or as a threat. Non-participants expressed less fear of sanctions if not participating. Less positive attitudes towards clinical audits came from older GPs working in small practices. The study exemplified the importance of 'getting people to talk' about initiatives as that triggered participation. It is unknown from the publication whether the study audit used any incentives (e.g. money) for participation.
It should be remembered that prescribing outcome will be no better than the design of the prescribing indicators themselves. No studies were found that investigated if achievement in one clinical area was reflected in another area, i.e. if an accomplished incentive target on proton pump inhibitors would automatically improve the prescribing of antibiotics. The transferability of skills acquired in a PIS should be investigated.

1.4.5 Education and outreach activities
A review of the effectiveness of education strategies designed to change physician performance and health care outcome suggested that multi-method interventions gives a better result than single-method interventions (Mason et al., 2002). Mere postal distribution of information had little effect whereas outreach visits, reminders and opinion leaders were more effective (Mason et al., 2002). Reviews also concluded that printed educational materials alone were ineffective as a means for change of prescribing behaviour and health care outcome (Soumerai et al., 1989; Freemantle et al., 2002 respectively).

Educational outreach (also called outreach visits or academic detailing) is a technique for influencing prescribing behaviour where, in case of prescribing, a pharmacist visits the GP in the practice and provides evidence-based education in order to improve quality of prescribing (Boardman et al., 1999). Educational outreach visits have been shown to promote changes in GPs’ prescribing habits (Freemantle et al., 2002).

In a study by Von Ferber and colleagues (1999), educational outreach was applied in an experiment with 79 GPs who met monthly over a period of eight months. The meetings were led by pharmacists and lasted for 2.5 hours and one clinical topic was discussed in depth each time. 75% of the practices participating in the study were single-handers. Prescribing data were analysed on a quarterly basis during the time of the study and it was found that participants cut back increases in total prescribing costs by 8% compared with non-participants. The author concluded that this was an effective method to optimise the quality of prescribing and to reduce drug costs and suggested that educational meetings should be part of a continuous agenda. The optimum number of sessions prescribing change was not established in the article. It could be proposed that arranging meetings of such length and frequency could be difficult to arrange with UK GPs.
A study by Leach (1999) showed that regular visits from pharmacists to discuss prescribing were useful for achieving and sustaining prescribing changes at 3, 6 and 12 months follow-up. The results showed that the practices with pharmacist visits prescribed more generically than the GPs that received no visits. Changes were small but still measurable. The number of GPs in the study was also small (11). Revised literature did not reveal any major advancement in the doctor-pharmacist relationship since 1990 when Harding and Taylor (1990) described the role of the pharmacist as reserved in GP practices.

Influencing prescribing requires a well thought-out strategy and strong leadership from the PCT (Audit Commission, 2003). The PCT should continuously disseminate messages that are consistent and be connected with an influential Prescribing Lead. The Prescribing Lead is a new position in the PCT whereby an appointed GP acts as a bridge between the PCT prescribing team and GP colleagues. It is important that this person is committed in their work and is seen as a role model by peers. It has been shown however, that only one of four Prescribing Leads had a written job description and that one in three never attend practice meetings together with a Pharmaceutical Advisor (PA) to promote good prescribing, which would seem appropriate (Audit Commission, 2003).

PAs are employed by the PCT to monitor and support GP prescribing in the locality and to identify, resolve and prevent potential and actual drug related problems. Pharmacists that work in the PCT have job titles such as pharmaceutical advisors, prescribing advisors, or support pharmacist and their tasks vary slightly. For the purpose of this thesis these pharmacists are all labelled as PAs. The PA is more often involved in strategic and financial issues while the prescribing advisors and support pharmacist have more hands-on role, for example updating guidelines and visiting GP practices. Unfortunately, many PAs get involved in administration and data analysis, which is perhaps an inefficient use of their specialist skills. The Audit Commission (2003) found that over 50% of PAs had no supporting staff for data analysis and 38% had no administrative support. Other PAs spent most of their time involved in higher strategy planning and did not share ideas in local networks. The investigation highlighted the issue of striking the right balance between daily practical work and strategic planning especially as the PCTs are responsible both for supporting and controlling GP
prescribing. As an effective method for implementing change face-to-face contact has been recommended between the PCT prescribing team and the GPs (Audit Commission, 2003). Other studies have reported that face-to-face contact between the expert and the doctor as an important for success of the intervention (Anderson and Lexchin, 1996).

With the proposed changes for the pharmacist's role (RPSGB, 2002) research has investigated new professional roles for pharmacists and how other health professionals regard pharmacists. A study by Watson (2001) found that community pharmacists were perceived as suited for providing prescribing information by undertaking educational outreach visits in GP practices; 80% of the GPs said that the educational outreach visits were beneficial, and 27 of them (79%) said it was an effective method of getting prescribing information. Some respondents in this study said that these visits would be most suited to 'problem practices' rather than GPs who were already prescribing in the required style. Participating GPs suggested that the educational outreach visits should include discussions around the practice's PACT data. On a quarterly basis GPs get issued the PACT Standard Report which contains details about prescribing and comparisons with similar practices but few GPs used the data to any great extent (Jones et al., 2002). But prescribing feedback is not a new initiative and has existed almost as long as the NHS itself (Roberts and Harris, 1993).

In a programme undertaken by a UK Health Authority, it was shown that the relationship between pharmacists and GPs should be improved to enable greater pharmacists' influence on GP prescribing (Dodds, 2001). The study showed that once relations had improved, a reduced prescribing growth and increased use of generic drugs was achieved. Hurdles that faced the pharmacist team included:

- Initial reluctance by some GPs to discuss prescribing as they felt challenged in their abilities and prescribing freedom
- Meeting time taken up by practices to vent their anger about their PCG instead of discussing prescribing

The scheme was successful in that it showed how an initially imperfect relationship could develop to one of trust and co-operation and eventually contribute to improved prescribing practice; prescribing growth was reduced and generic prescribing increased.
The team of advisors was drawn from different backgrounds such as community, hospital and the Department of Health which gave GPs experience from pharmacists with different professional backgrounds. The study did not state the size of the GP sample and the programme would need to be repeated across Health Authorities to assess whether findings were generalisable.

1.4.6 Commercial influences

For the purpose of this thesis, commercial influences are described as information and promotions from the pharmaceutical industry as well as advertisements in journals. Since the beginning of the 1980s, if not before, it has been shown that commercial sources have an influence on GP prescribing (Somerset et al., 2001). Somerset and colleagues (2001) referred to an article by Avorn (1982) where it was found that commercial sources had greater influence than scientific sources on GPs' prescribing behaviour. The pharmaceutical industry spread their messages widely; almost half (42%) of a 200 GPs sample had received information about a particular new drug from a drug representative (Somerset et al., 2001). Other research showed that GPs who had frequent contact with drug representatives showed less rational prescribing patterns (McGettigan et al., 2001).

A survey of 1714 GPs suggested that GPs who reported weekly contact with drug representatives were more likely to express views that may lead to unnecessary prescribing (Watkins et al., 2003). The study showed that over half of the GPs (55.5%) from high-cost prescribing practices saw drug representatives almost every day or at least once a week compared to only 28.7% from low-cost prescribing practices. The study also showed that GPs who see drug representatives tended to be isolated from their colleagues; single-handed practitioners, or practices without teaching status or those who worked in deprived areas.

The pharmaceutical industry spends large sums on marketing activities which is additional evidence that such activities are worthwhile. On request of the US Congress, the General Accounting Office reported that the pharmaceutical industry spends $19.1bn on all promotional activities of which $2.7bn goes to consumer advertising. The industry still spends more on research and development ($30.3bn) (Gottlieb, 2002). Some US drug companies were observed to pay doctors $50 (£34) for a 10-minute
meeting with their drug representative. The chairman of the American Medical Association commented that it was unethical to accept this offer from the industry and furthermore that doctors are not supposed to accept cash (Spurgeon, 2002). Such methods could put pressure on the doctor to prescribe the advertised drug as a form of repayment to the company (Moynihan, 2003).

Previously, the pharmaceutical industry marketed their drugs through ‘conferences’ where the daily programmes more resembled holiday, but such activities has ceased at least in some countries. In January 2005, Swedish health authorities implemented a legislation that the industry is only allowed to sponsor doctors with maximum 50% towards attendance costs to conferences or meetings. The other half must come from the local council. The purpose of this reform is to increase transparency in industry sponsorships and to control biased information to doctors. There is evidence that marketing activities do influence prescribers; the prescribing patterns of two drugs before and after an industry sponsored symposia was investigated in hospital doctors in the US (Orlowski et al. 1992). Only about 10% of the attending doctors thought that their prescribing patterns would be affected by the enticements. Prescribing patterns showed that there was a significantly increased prescribing of the two promoted drugs after the symposium. The prescribing of these drugs was also more than three times as high as the national average (Orlowski et al. 1992). It was clear from the study that doctors are influenced by the pharmaceutical industry even if they did not think so.

The pharmaceutical industry has developed other strategies to market their drugs less blatantly, for example, through collaboration with PCTs. In such a programme Wyeth paid outreach pharmacists to assess prescribing of Proton Pump Inhibitors (PPI) in GP practices. The pharmacists switched patients to lansoprazole and reduced healing doses to maintenance doses as appropriate. The project saved £622,367 yearly in the 60 participating practices representing 9.2% of previous year’s PPI costs (Thorburn, 2000). Another approach is to use third party spokesmen; the industry delivers their messages to doctors via a spokesperson with high credibility and who seems like an independent person. Third party messengers should readily be disclosed to alert the audience of potentially biased information (Burton and Rowell, 2003). Sommerset and colleagues (2001) highlighted that GPs need another professional that can provide independent
information about drugs. PAs would probably argue that this is their role; giving independent information to GPs in order to achieve high quality prescribing.

Sbarbaro (2001) suggested that pharmaceutical companies can successfully influence a doctor to change prescribing behaviour through the following steps:

1. A personal relationship is established with the doctor/GP at the beginning with a low-key introduction
2. The pharmaceutical company gains an insight into the GPs' prescribing habits
3. The company introduces a simple message aimed for inclusion in the practice
4. The doctor is then engaged in an interactive discussion process
5. Subsequent and repeated contacts are made with the GP to create a firm personal relationship, and to support a lasting change in prescribing behaviour
6. The programme is initially focused on respected doctors
7. Both sides of a controversial issue are always represented
8. The message is expanded after four to six weeks

Sbarbaro (2001) meant that there is much to learn from the pharmaceutical industry and potentially, the PAs could follow the same steps when introducing their messages of prescribing. There is however some issues which may hinder direct transfer of this approach to the NHS:

- Drug representatives work full time with promotional activities - PAs have many other responsibilities e.g. drug budgets
- Drug representatives usually bring information about one or a few products - the PA is supposed to support all prescribing areas
- The pharmaceutical industry has more resources for promotion - the PCTs have little resource in comparison and are short-handed to work according to the same principles of marketing strategies

In summary, it is known that doctors who have frequent contact with drug representatives:

- Are more willing to prescribe new drugs
- Do not like ending consultations with advice only (they would rather write a prescription)
- Are more likely to agree to prescribe a drug that is not clinically indicated
(Abbasi and Smith, 2003)

The regulations around sponsored research in academia are being reviewed (Moynihan, 2003) and potentially regulations could be extended to involve the relationship between the industry and doctors. The World Medical Association (WMA) acknowledged that a potential conflict of interest exists when a commercial enterprise has a direct or indirect influence on GPs prescribing habits, for example when the commercial enterprise offers financial support to the doctor. In 2003, the association therefore proposed guidelines for ethical relations between doctor and commercial company such as recommendations for industry sponsorship of conferences, research, and gifts to doctors (Mayor, 2003).

The Audit Commission (2003) suggested that the PCTs take a firm position against commercial influences but did not explicitly say how to do this. Potentially, this could be done by encouraging practices to develop their own protocols on how to deal with drug companies. The PCTs could provide advice and training on how GPs should deal with drug representatives and how to critically appraise scientific findings. Practices should have their own practice formularies or local PCT formularies for guidance on their prescribing.

1.4.7 National support mechanisms

The below section outlines national support organisations with the roles to support containment of prescribing costs and to provide guidance on good quality of prescribing. Published literature provided little evidence for their direct influence on GP prescribing. It is noteworthy that there are systems in place for supporting and controlling prescribing but that little is known about their effectiveness.

Prescribing Support Unit

The Prescribing Support Unit (PSU) is an analytical unit funded by the Department of Health. Their role is to support prescribing initiatives at all levels of the NHS; national as well as local. They provide prescribing information to promote and improve the cost effectiveness of prescribing in England (Prescribing Support Unit Homepage).
Introduction

National Prescribing Centre
In 1996, the Department of Health formed a new health service organisation called the National Prescribing Centre (NPC). The NPC and the PSU share some common purposes is that they both help the promotion of high quality and cost-effective prescribing, but the NPC is also involved in medicines management (National Prescribing Centre Homepage). Their activities include information on medicines and their use, education and training, dissemination of good practice, information technology, and informing research and initiatives in future prescribing strategies. Their activities are targeted directly to SHAs, PCTs and GPs but also towards clinical governance programmes, NSFs and NICE.

Prescription Pricing Authority
The PPA occupies a unique position within the NHS. They manage the payments to pharmacists for each dispensed prescription; they support the management of prescribing budgets; and they inform GPs, nurses, PCTs about prescribing volumes, trends and costs through their PACT database (Prescription Pricing Authority Homepage).

1.4.8 Practical considerations of influencing prescribing
In general, GPs aspire to keep up-to-date about drugs and treatment options (Carthey, 2000) but are not eagerly waiting to take up 'new knowledge' such as research evidence (Budd and Dawson, 1994). A clinician's main focus is to pragmatically solve practical problems (Budd and Dawson, 1994). The last sections of this chapter widen previous discussions of factors influencing prescribing and intervention uptake by highlighting pragmatic constraints.

Timing of the intervention
It was recognised that timing of the implementation of a new programme was often crucial to the degree of uptake as other activities within the organisation could overshadow the change programme (The Cabinet Office Homepage). It was important to involve the audience for the intervention, i.e. the GPs themselves who could provide ideas for timing and process of dissemination for improved uptake of the intervention.
Introduction

Timeframe for change
Strang and Sheridan (2003) investigated compliance with national methadone guidelines and reported that change was still accumulating six years after implementation. The authors suggested that health planners and researchers should keep in mind that changing practice may take several years and to allow for this when initiating change programmes. Insights as to why results can be outstanding concluded that only through self-recognition can sub-optimal prescribing be altered and improved (von Feber, 1999).

Workload and competing interests
It has been recognised that GPs’ workloads have increased over recent years due to a higher proportion of female GPs in part-time employment and early retirement, which has become more common (National Prescribing Centre and The NHS Executive, 1998). This may explain why new initiatives are not absorbed instantly – “there are just so many other things to do”.

Hospital initiated prescribing
Shared care between primary and secondary care means that the GPs may need to take on responsibility for specialist drugs. GPs have reacted against this; by issuing prescriptions they become legally responsible for drugs which require expertise within a specialty. Two approaches in shared care were investigated: the ‘tell’ and the ‘sell’ approach (Horne et al., 2001). In the ‘tell’ approach the consultant simply prescribed the specialist drug without consulting the GP beforehand whereas in the ‘sell’ approach, the consultant called the GP before issuing the specialist drug. Consultants who preferred the ‘tell’ approach regarded the GPs situation as ‘simple’ and thought that their role was to sign the prescriptions. GPs objected and pointed out that issuing a prescription was associated with legal obligations. Not surprisingly, the GPs were happier to take over the prescribing if they had been involved at an earlier stage.

Footnotes:
1 Shared care is “the joint participation of hospital consultants and GPs in the planned delivery of care for patients with a chronic condition, informed by an enhanced information exchange over and above routine discharge and referral letters. (Horne et al., 2001)
2 The definition of ‘specialist drugs’ is a medicine, often expensive, always initiated in secondary care and require complex prescribing and/or therapeutic monitoring not normally undertaken in primary care (Horne et al., 2001)
Patients
In this thesis, patient influence is only discussed in relation to influencing the prescribing process and thus not extended to patient safety or to a fuller discussion on compliance. Research has shown that patient expectations have an influence on GP prescribing; one of the most important factors was that of patient demand (Schwartz, 1989). It was found that patients who expected a prescription were five times as likely to receive one (Webb and Lloyd, 1994). A study of antibiotic prescribing showed that most patients who expected their doctor to prescribe an antibiotic also received one: 474 of the 560 patients (85%) who expected an antibiotic received a prescription compared with 54 out of 133 (41%) who did not (Macfarlane, 1997). GPs' time and willingness to repeatedly explain reasons for not prescribing determined whether the patient would receive the prescription they demanded (Carthy, 2000).

Generally, GPs perceived patients with lower incomes to show a greater demand for a prescription than middle-class patients, but the latter group requested more expensive preparations (Stevenson et al., 1999). Stevenson and colleagues suggested that the doctor-patient relationship was more important than cutting prescribing cost. GPs were also found to exceed patients' expectations for receiving a prescription; incorrect interpretation of patients’ expectations for a prescription caused unnecessary prescriptions which may result in poor patient compliance (Britten et al., 2000). In support of this, an estimated 5-7% of the prescriptions are known never to be dispensed (Beardon, 1993).

Size and characteristics of practice
Senior and colleagues (2003) indicated that there was no effect on prescribing in a range of therapeutic areas whether the practice had one or several GPs, but suggested that there may be a clustering effect of prescribing behaviours in practices where partners agree prescribing policies or influence each other's behaviour. Another study with single-handed GPs showed that peer discussions improved prescribing patterns (Dent et al., 2001). Furthermore, practices that were unaware of their high prescribing costs did not expect to change their prescribing whereas knowledge of their high prescribing costs made them likely to do so. Paradoxically, practices with the lowest quality of prescribing were least likely to change (Ashworth et al., 2000). This showed that knowledge about one's behaviour can facilitate change in some, but not all situations.
1.5 CONCLUSIONS

GP prescribing takes up a large share of the PCT budget and prescribing costs are increasing rapidly. The prescribing process is very complex and influences on prescribing vary between individual GPs and practices. Since the PCTs were established as free-standing bodies there has been an increased need for information and evidence on primary care prescribing. Substantial resource use and escalating drug expenditure motivate the reason to influence prescribing in efforts to get the best possible value from money invested in drugs. The Audit Commission (2003) produced a report in order to provide evidence to help the PCTs undertake their important agenda in prescribing; increasing quality while containing costs.

Different methods have been implemented and encouraged by the Government in efforts to slow down escalating prescribing costs and increase quality of practice including: local formularies, prescribing incentive schemes, educational activities and prescribing outreach. The effect of initiatives varied and no definite conclusions about the effect of a specific intervention or how to measure the size of the effect could be made from studies (Oxman et al., 1995). The evidence that a single intervention has no or little effect while a combination of interventions makes a greater impact may explain why the NHS has launched a number of initiatives in a short time period.

For driving the current health care agenda the Department of Health (2001) recommended multidisciplinary PCT leadership with management staff with and without clinical background (2001). This responsibility calls for collaborative working between GPs and PCTs and to have a common goal in mind when it comes to prescribing. One must be realistic that changes cannot be made instantly due to historic, political and monetary reasons. In addition, habit is the brutal enemy of change (Sbarbaro, 2001).

The research presented in this thesis was one attempt by two PCTs to improve primary care prescribing by assessing what factors influence prescribing and why this was so. This literature review highlighted that much research on prescribing influences has variably ignored potential factors of prescribing impact such as GPs' demographics, the characteristics of the practice, and policy imperatives. No identified studies have
connected all these factors with prescribing data. This thesis aims to contribute where such evidence is yet outstanding.
CHAPTER 2

AIMS OF THE RESEARCH
2.1 THE DEVELOPMENT OF RESEARCH QUESTIONS

As described in Chapter 1, prescribing of medicines has become a major focus for the NHS over the years. The reasons for this are several: there is an increasing armoury of medicines, medicines relying on new technologies are becoming increasingly expensive; medicines can replace hospital admissions thereby potentially save money; the hazards of erroneous prescribing of medicines has been raised in public media; the UK population is getting older and more people thus need medicines, patients have greater demands on their treatment and may request prescription medicines, and the prescribing costs have increased by 10% annually (Audit Commission, 2003).

The current restructuring of the NHS as set out in the document The NHS Plan (2000) assigns increased dependence on the primary care sector. With respect to prescribing, the PCTs now have responsibility for allocating the prescribing budget to the practices within the PCT and are also accountable for the way budgets are used. The PCTs distribute a sum of money to each general practice to be used for prescribing but PCTs are not necessarily given any control over the practice and their spending. This is where this study finds itself; in support of the PCTs responding to NHS demands.

It is widely known that prescribing has both quality and cost effectiveness components. Neither component is the main interest of this thesis; instead this research looks at perceptions around what factors influence prescribing practice and how these relate to prescribing profiles to inform the development of a pragmatic model that describes and explains the influences on prescribing. By understanding the factors that influence a prescriber’s decisions to issue a prescription, and how these perceptions relate to prescribing profiles, PCTs will be better equipped to meet the NHS demands.

2.2 PRINCIPAL RESEARCH QUESTIONS

i. What are the GPs’ perceptions of prescribing and important influences, in the two PCTs under investigation at two time points?
ii. How do GPs’ perceptions of prescribing and GPs’ demographics and characteristics relate?
iii. What are GPs and stakeholders in-depth perceptions of prescribing and what influence does policy have on the process?
iv. What are the prescribing trends in the study population?
v. How do these trends relate to GPs’ perceptions of prescribing?
vi. How are GP characteristics, perceptions, prescribing trends and PCT activities related?

2.2.1 Principal hypotheses
I. GPs’ perceptions of prescribing relate to their characteristics and prescribing behaviours.
II. The relationship between prescribing trends and the incentives and activities promoted by the PCTs vary
III. Different health professionals (even within the same profession) differ in their perceptions of prescribing

2.3 AIMS OF THE THESIS

The two main aims of this thesis are:
i) To investigate what influences prescribing within primary care by describing and relating perceptions of prescribing, prescribing trends and prescribing policy.
ii) To make recommendations for prescribing management based on the outcomes for the studies

2.4 OBJECTIVES OF THE THESIS

An exploratory approach was taken to developing the study design and several hypotheses were generated and tested. In order to achieve these aims the following objectives were operationalised:
i. To evaluate and appraise the existing evidence around prescribing
ii. To describe the perceptions of prescribing influences in the study population
iii. To relate the perceptions of prescribing influences to the characteristics of the prescribers
iv. To describe prescribing trends in the two PCTs
Aims of the Research

v. To relate the prescribing trends to the perceptions and characteristics of prescribers in the two PCTs

vi. To relate prescribing trends to prescribing activities promoted by the PCTs

vii. To describe the perceptions of GPs, PCT personnel and stakeholders in depth

viii. To triangulate the data from the previous stages to build a model that explains the influences on prescribing

In order to achieve these objectives the following approaches were taken.

- The evaluation of existing evidence was based on a comprehensive literature review
- Perceptions were collected using survey methodology (postal questionnaires) at two time points
- GP perceptions were related to their characteristics using a novel application of cluster analysis
- Describing and interpreting prescribing utilized prescribing data from the ePACT database. To relate the prescribing data to the PCT activities and GPs' perceptions and characteristics, sequence graphs and an intervention analysis based on ARIMA modeling was utilized
- The description of perceptions of a sub sample of GPs, stakeholders and PCT personnel utilized one-to-one semi-structured interview techniques
- Data from all stages were combined in order to build a model that explained the influences on prescribing

The project comprises five studies in order to achieve its aims. These are displayed visually in the pie chart in figure 2.1. Each study is described in a separate chapter in the thesis.
Aims of the Research

Figure 2.1. The separate studies within the project
CHAPTER 3

MATERIALS AND METHODS
3.1 INTRODUCTION

This chapter provides an overview of methods of data collection and analyses relevant to this thesis. Thus, not all available research methods applicable to health services research are discussed. The chapter is divided into two main parts: the research process and methods, followed by the materials utilised in this thesis. The first main part describes the research process in general terms followed by data collection methods, data issues, data management and data analysis. The first part ends with a summary of the research approach taken in this project. The second main part describes the materials used in the project.

A pragmatic approach was taken in this project using a mix of qualitative and quantitative data to explore a wide range of factors that influence prescribing. Figure 3.1 outlines the issues discussed in this chapter (square boxes) and how this fits with the studies presented in the thesis (ovals).

Figure 3.1 Outline of issues discussed in chapter 3 relating to studies in the thesis
3.2 THE RESEARCH PROCESS

This section gives a general overview of the concepts and processes of a research project. The issues discussed in this section were guidance rather than rules when constructing the project plan.

The research process starts with posing questions for inquiry. These research questions can be generated from a wide range of sources such as previous work, practical experience, or novel ideas. The research questions help to define the hypothesis, which sets the frame for the research to be undertaken. The project aims set out what will be investigated in the study, thereby linked to the hypotheses (figure 3.2). A research project does not have to have a hypothesis but it aids focusing on what the project aims to achieve. The findings from the study will support or reject the hypothesis. The statistical measure that informs the certainty behind correctly accepting or rejecting the hypothesis is called the power of the study; the probability of correctly rejecting a false null hypothesis. The use of power calculations are common in randomised controlled trials.

Figure 3.2 Proposed outline of the development of a research project plan
Study objectives are useful as they specify how the research process will be undertaken step by step. The objectives outline what methods (e.g. survey, interview) and research instruments (the questionnaire, the interview schedule) will be used for collecting and analysing the data to meet the project aims. The same aim can be fulfilled by using different types of methods but depending on method, different conclusions may be generated. Practical considerations often play a part in what method is used.

3.2.1 Theory of research

Most research builds on or draws on previous work in the area. It may or may not be based on a theoretical concept. The definition of theory according to Robson (2002) is 'a proposed explanation for phenomena, or sets of occurrences, or of relationships'. In wider terms it is defined as 'a statement describing how some part of the world works'. As the word theory is not only used within research, the additional condition for a scientific theory is that it has to be testable.

There is a scholarly debate within practice research whether it is appropriate to build the project on a theory; views from academic researchers' also range from the luxury to the practicality of having a theory (Robson, 2002). It has been voiced that theory inhibits exploration of issues outside the theoretical framework and that theory can stifle innovation in practice. Although theory may be vital to some research not all projects need to be built on one, for example this project was not built on theoretical constructs.
3.3 DESIGN OF THE RESEARCH

This section describes quantitative and qualitative research methods and measures. Some prime attributes distinguishing these methods are summarised in table 3.1.

Table 3.1 Examples of attributes of studies building on quantitative and qualitative paradigms

<table>
<thead>
<tr>
<th>Study components</th>
<th>Quantitative study attributes</th>
<th>Qualitative study attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical concepts</td>
<td>The generation of theory is deductive and builds on scientific empiricism Theory is objective and verifiable which makes repetition of study possible</td>
<td>The generation of theory is inductive and requires interpretation The inductive theory can change during the study as more evidence is collected</td>
</tr>
<tr>
<td>Objective of study</td>
<td>To quantify data and generalise results from a sample to the population of interest To measure the incidence of various views and opinions in a chosen sample To test hypothesis</td>
<td>To explore and gain understanding of underlying reasons and motivations for an issue or behaviour To provide insights into the setting of a problem, generating ideas and/or hypotheses</td>
</tr>
<tr>
<td>Sample</td>
<td>Usually a large number of cases representing the population of interest Randomly selected respondents</td>
<td>Usually a small number of non-representative cases Respondents are selected theoretically to fulfil a given quota</td>
</tr>
<tr>
<td>Data collection</td>
<td>Often numerical data Detachment from data excludes the role of the context Structured techniques such as on-street or telephone interviews Postal questionnaires The study comprises a narrow band of variables</td>
<td>Non-numerical data is collected The researcher is often immersed in the data and includes the role of the context Unstructured or semi-structured techniques e.g. interviews or group discussions The study comprise a wide band of variables</td>
</tr>
<tr>
<td>Data analysis</td>
<td>Statistical analysis Findings are conclusive and usually descriptive in nature Analysis after the data collection</td>
<td>Non-statistical analysis of data Findings are not absolute Analysis in conjunction with data collection (grounded theory)</td>
</tr>
<tr>
<td>Outcome</td>
<td>Relationships are tested and proved Used to recommend a final course of action</td>
<td>Relationships are proposed but not tested and proved Findings are not conclusive and cannot be used to make generalisations about the population of interest To develop understanding and base for further decision making</td>
</tr>
</tbody>
</table>

3.3.1 Quantitative studies

Quantitative research can be experimental, quasi-experimental or non-experimental. Experiments involve testing variables for effect. A randomised-controlled study is an example of an experimental study design. Quasi-experiments are using experimental approaches but without randomising the sample. Non-experimental methods collect data in the natural environment and are useful when investigating behaviour. However, such
Quantitative methods are concerned with data that can be measured. The word ‘data’ are by definition ‘facts and statistics used for reference or analysis’ (Concise Oxford Dictionary 10th Ed). Data originate from Latin and are the plural form of ‘datum’. There are two types of quantitative data: i) discrete data which can only take a specific number e.g. number of prescribed medicines, or number of years since diagnosis, and ii) continuous data which can take any number on the scale e.g. weight and height. Ordinal (e.g. scales with discrete options such as strongly agree to strongly disagree) and categorical data (e.g. gender) are discrete data and are often used in surveys.

3.3.1.1 Survey studies

Surveys are a commonly used research instrument to explore opinions or perceptions of a large number of cases generating a lesser amount of in-depth detail. Types of surveys that measure opinions of a service or perceptions of a behaviour are referred to as social surveys. Descriptive surveys are used for collecting demographic data or evaluating political popularity trends. Longitudinal surveys are surveys repeated over time to assess influences of time on perceptions. Surveys are undertaken in the natural settings and the sample can be randomized or non-randomized. Questionnaires are the data collection tools commonly used in survey studies.

3.3.1.2 Survey tools

Questionnaires are often efficient ways to collect data but they must also be effective and stand up to assessments of validity and reliability. To be useful they must be attractive to the responders (Smith, 2002) so that responders will take their time completing the questionnaire. Questionnaires can be structured or semi-structured; semi-structured questionnaires use open questions whereas structured questionnaires uses closed questions that are set on a scale and have given response alternatives. A mixture can be used in the same survey. Data are economically and easily collected through structured questionnaires and ambiguity in response is minimised. Drawbacks include that they are less comprehensive than a questionnaire with open questions and that the response alternatives may not fully match the respondent’s view. Qualitative methods can be used to further explore views.
The distribution of questionnaires can be for example postal or face-to-face. Schedules are either filled out by the researcher (in face-to-face settings) or by the respondent (self-administered). It is known that respondents can alter their answers in presence of the interviewer, especially in sensitive subjects such as sexual behaviour. To minimise interviewer bias postal questionnaires could be advantageous. The shortcomings of this are that data may be less reliable as there are no opportunities to prompt or explain an item on the schedule. Neither is there any control over who actually completed the questionnaire and if the responses reflect one or several perspectives; the responses could come from a group! Despite the drawbacks of questionnaires, they are widely used in, for example, health services research as they are an efficient and simple method of data collection.

3.3.1.3 Types of scales
The selection of scale and development of the survey will depend on the study objectives and the type of information sought. This section presents in order; Likert, Guttman, Thurstone and semantic differential scales.

No scale is superior to another but the context in which it is used must be considered. As not every scale is appropriate for every type of statistical analysis, each should be appraised before the scale is selected. Some statistical tests require a linear, or assumed linear relationship of the responses. The Likert scale is an example of an assumed linear scale.

**Likert scales**
Likert scales are commonly used in health services research and are useful when measuring opinions. They are held to be quick to administer, easy for the respondent to understand and appropriate for statistical analysis. They are called *a priori* scales, as the values on the scale are set beforehand. The most common Likert scale is the categorical scale set on 5 or 7 steps. Too few steps (3-4) may lead to inaccurate or missed responses, whereas many steps generate a greater discriminative power between responses. However, too many steps can cause unreliable data, as shown with a test re-test assessment. The aim is to have a scale with the greatest discriminating power but yet provide reliability (Smith, 2002). For this reason the 5 step Likert scale is the most commonly used (Bowling, 2002).
Each step of the Likert scale has a descriptive tag written on the survey instrument, for example 'strongly disagree', 'disagree', 'neither disagree nor agree' or 'uncertain', 'agree' and 'strongly agree' or 'very satisfactory', 'satisfactory', 'neither satisfactory nor unsatisfactory' and so on. There is a debate of which middle option is the most appropriate to use; 'neither nor...' or 'uncertain'. The context of the questionnaire should guide which of the two options is selected as they mean different things. In some cases it may be appropriate not to have a middle option in order to force responses towards either end. Drawbacks include a potentially increased number of missing responses, a distortion of views or low reliability of respondents holding a neutral view. Likert scales provide ordinal data; it cannot be assumed that the responder perceives the interval between 'strongly agree' and 'agree' to be the same as the distance between 'strongly disagree' and 'disagree'. Two respondents may also interpret 'agree' differently and put different weight to the expression. No absolute values can therefore be extracted from Likert scales, only indicative trends. Such is the nature of ordinal data.

Visual analogue scales (VAS) are a type of scale that may or may not have descriptive anchors at each end of a line (figure 3.3). The respondent is free to mark their answer at any point of the line but it should be noted that even if the line is continuous, responses can not be assumed to be so. There is no conclusive evidence whether the VAS or the traditional Likert scale generates superior results (Bowling, 2002).

Guttman scales
Guttman scales measure attitudes or abilities by using hierarchical statements, where the responder marks agreement with each statement. Agreement with a statement higher up on the hierarchy assumes agreement with a statement lower down. Due to their cumulative property, Guttman scales are sometimes called cumulated scales. These types of scales are laborious to develop and require repeated piloting in order to ensure validity. The Index of Activities of Daily Living by Katz and colleagues (1963) is an example of a famous Guttman scale; the questionnaire statements describe increasingly difficult everyday tasks to test for mobility dysfunctions.
Thurstone
The Thurstone scale was developed in 1928 and was the first attitude scale; a predecessor to the Likert scale. Thurstone scales are not commonly used due to the cumbersome development process; a large number of statements (100-150) are first developed on the issue for investigation. The statements can be agreed or disagreed with and judges sort the statements into 11 piles of level of agreement. For validity of the scale a large number of judges is required; recommendations in literature vary between 50 and 100, and >300 (Robson, 2002; Bowling, 2002 respectively). Between 1 and 3 statements are then picked out from each of the 11 piles and these statements constitute the final scale. The statements are presented to the respondent who picks out the statements they agree with and their score is calculated.

Semantic-differential
The semantic-differential scale is different from the attitude scales in that it collects the meaning that the respondent attaches to a word or a concept. Each statement in the scale has a pair of adjectives representing opposites, e.g. good-bad, strong-weak, fast-slow. Previous research has evaluated pairs of adjectives that are meaningful for investigations. Semantic-differential surveys are not difficult to construct but the respondent may find them peculiar and the statistical utility is minimised as no linear relationships can be assumed.

3.3.2 Qualitative studies
Qualitative research “studies things in their natural setting, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them” (Denzin, 1994). Qualitative research uses “a holistic perspective which preserves the complexities of human behaviour” (Black, 1994). Qualitative methods are suitable for the projects that look at humans and their behaviour.

Research questions that ask ‘why’ or ‘how’ and that look to explore and explain issues are suited for a qualitative approach. Examination of relationships between subjects and/or variables can also be done qualitatively. Data tend to be non-numerical, although content analysis uses numerical data in the analysis. Qualitative research is now regarded, in many situations, as not only a complement to, but also a prerequisite to quantitative research as it can generate hypothesis or build theory (Bowling, 2002).
Miles and Huberaman (1994) suggested that it is as valid to have a theory before the data are analysed, as it is to allow the analysis to produce a theory; theory can thus be implicit or explicit in qualitative studies. Grounded theory developed by Glaser and Straus in 1967, is a theory-generating methodology as opposed to theory-verifying. It is set on principles of systematic data collection and analysis where ideas, themes, hypothesis and theory emerge from the data.

A major strength of qualitative research is that it allows for flexibility to the response. The study can be modified throughout the project to better reflect the outcomes and new issues can be incorporated into the protocol. An example of the latter would be incorporation of a new question in the interview schedule that was relevant to the subject of inquiry.

Qualitative methods have long been used in social and psychological sciences and more recently in health services research. In pharmacy practice research, qualitative studies have appeared in literature for a bit more than a decade (Smith, 2002). There has been a conflict between quantitative and qualitative schools of research, which to some extent still remains. In 1994, it was reported that a finding is more likely to be held as a fact if it is quantitative (Black, 1994). Smith (2002) reported that high impact studies were more often quantitative than qualitative. Qualitative studies are still criticised for being difficult to appraise as there is no agreed way of assessing their quality (Dixon-Woods, 2004). In spite of this, qualitative research has gained grounds as a valid research approach in health services research; the BMJ frequently publish qualitative studies.

As qualitative research per se is ‘non-standard, unconfined, and influenced by the researcher and the research subject in terms of experience and perceptions’, it makes it harder to form standardised criteria for judgment. Nine questions should be considered when evaluating the robustness of qualitative studies or developing new studies:

1. Does the research project describe an important problem examined through a clearly formulated question?
2. Was it appropriate to use a qualitative approach?
3. How were the research setting and subjects selected?
4. What was the researcher’s perspective and was that taken into account?
5. What methods were used to collect data and were these described in enough detail?
6. What methods were used to analyse the data and what quality control measures were implemented?
7. Were the results credible and if so, were they important for practice?
8. What conclusions were drawn and were they justifiable by the results?
9. Would the findings be transferable to another setting?

(Greenhalgh, 1997)

The collection of qualitative research can utilise a range of techniques such as group discussions (brainstorming, focus or consensus groups), interviews, observations, analysis of publications, pictures, audio recordings, transcripts from lectures and video clips.

3.3.2.1 Interviews and techniques

The types of the interview schedules range from structured to un-structured. A structured schedule uses closed questions whereas an un-structured introduces a subject upon which the interviewee is free to comment. The so-called semi-structured schedule is the middle-way allowing for new issues to emerge yet covering the specific issues for inquiry. The way the interview is undertaken and the type of schedule utilised determines the course; whether it is respondent-led or researcher-led. A semi-structured schedule comprises a mix of the respondent and researcher-led approach.

Performing interviews

Variation in the interview setting should be minimised between each interview. An 'independent setting' to which neither the interviewee nor the interviewer is more familiar is the best choice. This enhances the validity and prevents bias that can stem from the setting. This is sometimes compromised in real world research due to the additional resources (time and logistics) that may be needed when undertaking an interview in an independent setting. By using one interviewer for all the interviews, variation due to the interviewer is minimised. The less structured the interview schedule, the more variation can be expected from the researcher in undertaking the interview; if the researcher has preconceived ideas these could bias conduct.

Another type of bias is the Hawthorne effect where the presence of the interviewer has an impact on the interviewee so that responses are altered. The interviewee may want to
come across as favourable and therefore perhaps avoids a less popular (yet true) response. When there is a difference in hierarchy between the interviewee and the interviewer and when the interviewer represents an organisation to which the interviewee wants to look favourable, Hawthorne effect can be expected. Concealed participant observations as opposed to overt participant observations can be used to overcome Hawthorne effects. No such effective alteration of method is available to interview studies.

The interview should be conducted at a speed suitable for the interviewee. This is why each interview may vary in length. As a courtesy, which may also lead to additional findings, the interviewee should have the opportunity to express any additional views at the end of the interview.

3.3.3 The prescribing database

Electronic provision of Prescribing Analysis and Cost (PACT) data has been available since 1992 through the ePACT database; before then only paper versions were available to the NHS. ePACT data can be retrieved via the Internet on www.epact.ppa.nhs.uk which is available for authorised users with NHS Net access. The PCTs are authorised users and access to ePACT data can be gained via their terminals.

For GP prescribing data there are two types of databases within the ePACT system; the Toolkit and the ePACT.net. The databases contain different detail and type of prescribing data. The Toolkit database has pre-set queries within certain therapeutic areas. It was newly developed during the time of this project and the most detailed information that could be extracted at the time was quarterly data at practice level for groups of drugs. In ePACT.net the choice of information to retrieve is greater but the accuracy of denominators is lower than in the Toolkit. The most detailed information that can be extracted from the ePACT.net is the prescribing (cost, volume or item) of a specific dose of a trade name drug per GP and month. The PACT database does not contain any patient information (e.g. diagnosis and demographics) and therefore nothing can be said about appropriateness and the quality of prescribing with PACT data alone. Opportunities for feedback on the quality of prescribing would provide learning opportunities for the prescriber. Campbell et al. (2000) highlighted this problem but
said that there were ongoing projects looking at combining PACT data with clinical data in order to construct quality measures for prescribing.

Proxy indicators for quality have been created and installed in the PACT database by the Audit Commission (in 1994), the Prescribing Indicators Group (in 1997) and by Commission for Health Improvement (CHI) (in 2003). The PPA has also created additional indicators upon requests from PCTs. These indicators are all present in the Toolkit system and are facilitators for evaluating and comparing prescribing between practices and PCTs.

Numerator and denominator can be selected from the PACT database; the numerator can be a volume measure, a cost measure or an item. Average Daily Quantities (ADQ) is a volume measure unique to the UK that is modified from the internationally recognised Defined Daily Dose (DDD) as it is held in the UK that therapeutic traditions are different (Walley, 2000). Net Ingredient Cost is the basic price of the drug before any discounts, dispensing costs or fees have been added; it is the reimbursement cost of the drug and the price is listed in the Drug Tariff. ‘Item’ is a measure that is specified for each drug; one pill as well as one months supply can equal one item. The denominators can also take many forms, for example, drug volume, item, population size and cost parameters. Some of the denominators are adjusted to patient population of the practice as described below. The ‘numerator per denominator’ makes the ‘indicator’ that is used to measure prescribing.

Prescribing denominators

PU
Prescribing Units (PU) takes into account an elderly population. A patient over 65 years old is counted as three PUs due to the fact that, in general, older people use more medicines than younger people. This means that a practice with an elderly population is adjusted for higher volumes of prescribing compared to a practice with a younger population.

ASTRO-PU
Age Sex Temporary Resident Originated Prescribing Units (ASTRO-PU) was developed in 1993 as a refinement of the PUs (Roberts and Harris, 1993). Compared to
PUs, the age bands are refined and weight is also attributed to sex in different ages. Temporary residents are counted as half a PU.

**STAR-PU**

Specific Therapeutic Group Age Sex Related Prescribing Units (STAR-PU) were developed in 1995 by Lloyd and colleagues as a further refinement of ASTRO-PUs by making prescribing units specific to different therapeutic groups. As the name suggests the age and sex of the practice population are adjusted in different therapeutic areas. For example, the usage of cardiovascular drugs are greatest amongst the elderly and even more so in elderly men. Therefore, a population with a high number of elderly men has a greater allowance for these types of drugs compared to a practice with a lower proportion of elderly men.
3.4 DATA ISSUES

This section discusses types of data, and the credibility of data such as validity, reliability and generalisability of the data. Samples and methods of sampling are outlined followed by piloting methods.

3.4.1 Primary and secondary data

Data used that originally has another purpose than for which it is used in the project is called secondary data. Epidemiological databases and prescription databases (e.g. PACT) are examples of secondary data sources. Primary data is that collected for the purpose of a specific study and is typically collected through laboratory experiments, interviews, surveys, observations or group work. There are pros and cons with either type of data; while the quality of primary data can be controlled and specifically tailored to answer the questions of the study it can be costly and time consuming to collect. Secondary data may not be able to answer all of the researcher’s questions and potential confounders may be hiding in the data source. The researcher usually does not have any control over the way the data are collected or processed and it can be difficult to assess the quality and reliability of the data retrieved from secondary sources. Secondary data often needs manipulation in order to fit the requirements of the study but can still save resource and may be the only feasible option e.g. when data such as three years prescribing data of all doctors in a PCT is needed.

3.4.2 Credibility of data

The word ‘credibility’ is used as an umbrella concept for validity, reliability and applicability of the findings. It assesses how well the results can be relied on and how likely they are to be true. In qualitative data the concept of credibility is more often referred to in place of the separate concepts.

3.4.2.1 Validity

Validity refers to the accuracy, for example a research instrument is said to be valid if it measures what it intends to measure. Robson (2002) says that ‘at its most simple, this [validity] refers to the true status of research reports’. Validity is held to be inherent to qualitative methods as the issue for inquiry is explored and hence validated during the data collection (e.g. through interview or observation) (Smith, 2002). In interviews, the
credibility of findings can be further enhanced by having more than one person to code the audio taped data. Alternatively, an independent researcher can verify and discuss the coding. Different types of validity are explained and exemplified in table 3.2.
<table>
<thead>
<tr>
<th>Label of validity</th>
<th>Description of the validity</th>
<th>Example of process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicative</td>
<td>That findings are verified by additional data</td>
<td>Another set of interviews are undertaken that focus on a detail that needs further investigation</td>
</tr>
<tr>
<td>Argumentative</td>
<td>That findings prove valid by using the data to argue the reverse to the initial findings</td>
<td>Arguments are written up by the researcher or a colleague in order to get another perspective on the findings</td>
</tr>
<tr>
<td>Cumulative</td>
<td>That evidence from literature validates the findings</td>
<td>Literature is systematically compared to the findings of the study</td>
</tr>
<tr>
<td>Face</td>
<td>That the instrument accurately collect the necessary information for the study</td>
<td>An independent researcher estimates the likelihood that the respondent will understand and answer the questions, that the questions will be interpreted accurately, and the questions will capture the intended issues</td>
</tr>
<tr>
<td>Content</td>
<td>That relevant issues are covered in the instrument</td>
<td>Interviews that are undertaken prior to the construction of a questionnaire in order to capture all relevant issues enhance content validity</td>
</tr>
<tr>
<td></td>
<td>That the instrument is capable to accurately reflect the respondents’ views</td>
<td>Literature appraisal could increase the content validity</td>
</tr>
<tr>
<td></td>
<td>Content validity could potentially limit the testing of new associations</td>
<td>Often judged by one or more experts</td>
</tr>
<tr>
<td></td>
<td>Often part of the pilot work</td>
<td>An example of a low content validity would be to use a math test to assess the flexibility of ballet dancers</td>
</tr>
<tr>
<td>Construct</td>
<td>That the accurate conceptualisation of the phenomena is measured</td>
<td>The instrument can be compared to a &quot;gold standard&quot; measurement in the field. If there is no &quot;gold standard&quot; a set of experiments can be designed that assesses the instrument in e.g. different populations that are known to have a different amount of the property to be assessed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External (also called</td>
<td>That the instrument repeatedly generates satisfactory results in a wider population than</td>
<td>The instrument should be able to discriminate between populations that may be expected to differ on the construct</td>
</tr>
<tr>
<td>generalisability)</td>
<td>the instrument was designed for</td>
<td></td>
</tr>
<tr>
<td></td>
<td>That the instrument correlates with measures known to measure same concept</td>
<td></td>
</tr>
</tbody>
</table>

1. Research colleagues external to the project are often used for this assessment but ideally, a person from the population or a population that is similar to the research population should be consulted.
In order to be a useful tool the instrument must also have specificity; only to measure what it claims to measure. The sensitivity of an instrument is a measure of the amount of error inherent in the instrument itself. Evidence that an instrument can detect small changes in an attribute, called precision, is also an important factor.

3.4.2.2 Reliability

There are different types of reliability one of which is concerned with the extent to which a test instrument is able to produce the same data when measured by different users; called inter-rater reliability (Evans et al., 2004). Another type of reliability is the ability of the instrument to produce the same results at different times assuming that the phenomena that is being measured has not actually changed. This is called external reliability and is assessed by a test-retest where statistical testing can determine reliability (Cohen's kappa for nominal data, weighted kappa for ordinal data and Pearson correlation for interval data) (Robson, 2002).

Consistency (also called internal reliability) refers to the ability of the instrument to assess one dimension or concept; that the score of individual items correlates with the scores of all other items in the instrument. The internal reliability of survey scales can be measured with Cronbach’s alpha and split-half techniques. The so-called split-half method measures internal consistency by dividing the research instrument into half and the results from the subset compared. For Cronbach’s alpha the minimum of 0.3 is recommended for each item in the scale which contributes to 10% of the variance. A total alpha of 0.7 is desirable, implying 49% of variance is explained.

Generalisability (a form of external reliability) refers to the general applicability of the results in a wider context; for another sample at another point in time. The concept is more often discussed in quantitative than in qualitative studies. There is no intention in qualitative studies to produce generalisable results. Instead, intentions are to explain issues in-depth in a small sample. Findings from qualitative studies can be used to build theory that in turn may be generalisable. Quantitative studies are often set in a controlled environment or in a large sample and seek to prove the generalisability of the results through statistical testing. Furthermore, quantitative studies often set out to prove a hypothesis; whether the relationship is generalisable depends on how the hypothesis is worded and the strength of the calculated statistics. Generalisability can be measured
through reliability coefficients by using the instrument in different populations known to differ in the assessed property. An increased sample size and a robust sampling strategy can elevate generalisability provided that sampling procedures are valid, reliable and non-biased.

Reliability is not often assessed in qualitative research as an uncontrolled environment is expected to vary over time; merely an individual's way to express and explain an issue may change over time. Reproducibility of the findings overall is however expected; by re-coding the data 5 days after the first coding internal consistency can be assessed (Miles and Huberman, 1994).

### 3.4.2.3 Threats to validity and reliability

There are a number of threats to the validity and reliability of a study apart from potential faults in the construction of the research instrument itself. In textbooks these threats are often labelled bias and errors. Unless they are dealt with properly the truth may be distorted. Research design should seek to minimise bias but no research method is completely free from bias. The extent and types of bias and errors vary between quantitative and qualitative studies and are discussed below.

There are some biases that are very difficult to avoid. In interview and survey studies these include the yes-saying, recall and reporting bias. It is known that respondents are more likely to give a positive than a negative response; 'yes-saying'. Recall, or memory bias, has to do with the ability of the responder to correctly remember a situation or behaviour. The respondent can also withhold the requested information; reporting bias.

Sampling bias can occur when the sample differs from the population and therefore decreases the generalisability of the study. Non-response bias is a major and common type of bias in a study. When a group within the population with similar qualities does not participate in the study or when there are a lot of missing values on a certain question in a survey, the results can be skewed. The non-responding group may hold shared values, or there may be a common reason why they chose not to take part. When non-response is large, a follow up with these subjects should be undertaken to exclude non-responder bias so that generalisation can be made. The research instrument can
threaten generalisability if the constructs are too specific to the group that is studied, so that it has little applicability in another sample or wider population.

It has been proposed in qualitative studies that the researcher’s preconceptions and varying attention during the data collection can affect validity to a greater extent than in quantitative studies. Preconceptions can steer the choice of method and interpretation of the data. As in both qualitative and quantitative studies the participant may have hesitations about sharing certain views and give dishonest answers, which could bias the results. Poor data quality or missing data can threaten validity; it can therefore be useful to audio-record the interviews. Analyses of qualitative data are subjective as it requires interpretation by the researcher. The validity of the interpretation can be demonstrated by providing details of how the analysis was undertaken and conclusions were reached.

3.4.3 Sampling methods

There are many types of sampling strategies to choose from when designing a study and the methods differ between quantitative and qualitative studies. In quantitative studies random sampling is often preferred which includes the sub-types: unrestricted, simple, systematic, stratified, and cluster sampling. Non-random sampling is represented by quota sampling. In qualitative studies convenience, purposive, snowballing and theoretical sampling methods are common. They are commonly called non-probability samples or non-random sampling. Qualitative research is resource-intense and samples are often small. Random selection procedures are generally not appropriate as the participants often need to be considered in terms of their characteristics and relevance to the wider population. With a small sample, the researcher has more time to investigate details that may be important for explanations than if the sample was large. A few sampling methods are discussed below.

Probability sampling is used for quantitative studies where statistical representativeness is sought. These are also called random samples. Simple random sampling involves random selection of a certain number of cases from the population. In this way each member of the population has an equal chance of being selected. In stratified random sampling, the population is first divided into strata with specific characteristics before random sampling is performed from each of the strata. Cluster sampling is an efficient
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sampling method as it divides the populations into sub-populations and selects a sub-population from which a random sample is generated.

A census sample incorporates the whole population. Census studies are often expensive as they usually include a large number of subjects. ‘The Census’ is perhaps the most famous study in the UK which surveys all households.

Convenience sampling is often seen as the easiest choice in terms of effort needed to convene the sample. The sample however, becomes self-selected as only available and willing subjects take part. In snowballing techniques the participant is asked to give the name/s of other persons who may be interested in participating in the study. It is a convenient method when the researcher does not know the population and it can also be an effective method as it indirectly utilises peer pressure for recruitment. The approach may suffer from bias in that only subjects that are thought to be positive towards participation are referred. Nevertheless, it is a common and recognised method, especially in populations where participants are unknown or difficult to recruit through other means (e.g. illicit drug users and prostitutes). In purposive sampling the researcher approaches individuals that have certain characteristics that are of interest to the study. These preconceptions can stem from published work or from previous findings in the study. Studies that are guided by grounded theory may employ theoretical sampling. In theoretical sampling the subjects are convened through an iterative approach where sampling criteria are redesigned in each stage of analysis. New recruitment is guided by outcomes from previous stages in the study that has proved relevant to the evolving knowledge-base. In this way, the researcher can recruit subjects who successively add more detail to the knowledge-base. This sampling method is only possible in flexibly designed studies where the initial aims and objectives allow for alteration. The drawback of theoretical sampling is the risk that the study grows too big if there are no specified end points.

Many studies utilise more than one type of sampling strategy in order to meet the inclusion criteria, to fulfil the sample size and to stay within the time frame and resources available to the study.
3.4.3.1 Methods of piloting

For increased credibility the survey instrument should be tested before being used in the main study. Piloting should resemble the process and setting of the main study and a representative sample should as far as possible be used. In a census study, a sample that resembles the study population could be utilised.
3.5 DATA MANAGEMENT

3.5.1 Response rates
Response rates must be presented in quantitative studies and such practice is also recommended in qualitative studies. Non-response bias may occur if non-response rates are large and is more of a problem in certain sampling methods. In quota sampling, a high non-response rate in one of the quotas can severely affect the range of the sample and as such skew the conclusions. A similar problem with non-response bias is seen in purposive sampling methods. A large non-response rate should also be investigated when random sampling methods have been used.

To ensure the validity of the study, a non-responder follow-up should be undertaken as the non-responders may differ from the responders. By investigating why these subjects did not respond, the study findings can be enlarged and new hypotheses formed. Non-responder follow-up in qualitative studies are less common (Smith, 2002). Perhaps this is due to less guidance being available on how to handle a low response rates in qualitative studies and procedures for follow up.

In a survey the response rate can, in addition to the sampling method, be affected by the content, timing and layout of the questionnaire. One may think that a shorter questionnaire gives a higher response but it is not always the case; the same response was achieved with a 16-page schedule as with an 8-page schedule on the same topic (Cartwright, 1988). Cartwright also reported that more doctors responded to a questionnaire on the topic of ‘dying’ than on the topic of ‘prescribing’ (76% compared to 56%)(1978). In quantitative surveys a minimum response of 50% is sought while 70% is considered good. A low initial response can be improved with reminders i.e. prompting response by sending out the same questionnaire again.

3.5.2 Computer software analysis programmes
Both quantitative and qualitative data analysis software are available to aid structuring and analysing of the data. As such, software also helps to generate or confirm theory. Apart from being tools for effective analysis they also have a role in the validation
Materials and Methods

The Statistical Package for the Social Sciences (SPSS) and SAS are common quantitative programs used in health research and social sciences. More recently there have been developments within software for analysing qualitative data; Ethnograph, ATLAS-ti, QSR NUD*IST (Non-numerical Unstructured Data Indexing, Searching and Theory building) and its upgraded version QSR NUD*IST Vivo recognised as NVivo, are all widely used.

The following computer software were used in this project: Microsoft VISIO 2002 Professional, QSR NVivo version 1.3, Statistical Package for the Social Sciences (SPSS) version 11.0, Statistical Package for the Social Sciences (SPSS) version 12.0.1, ViaVoice Pro Release 8 for Windows, and Microsoft Excel and Microsoft Word 2000.

3.5.3 Coding of data
In order to provide a basis for data analysis, the data must be described; coded. The type of data and type of analysis that is requested will determine the coding. A coding frame is the specific structure in which the data are coded. The coding frame can be predetermined (before the data is collected) or emerge from the data in the coding process. The data can be themed; where individual codes are arranged in groups in order to focus extraction of pertinent issues from the data set.

3.5.4 Missing values
Missing values are often common in self-completed questionnaire data. As there are no recommendations on what is considered a 'high' frequency of missing values, it is often up to the researcher to decide a tolerable level. A high percentage of missing values limits the ways in which the results can be generalised to the responding population, as a bias may have occurred. The precision of calculated statistics may be reduced or assumptions behind statistical tests violated if the proportion of missing values is 'too' high (SPSS 12.0.1, 2004). While there may be many reasons behind a missing value the following are often recognised; the question was ambiguous or difficult, the question was too personal to the responder, the responder didn't know the answer, or questions were skipped as the questionnaire was 'too long'. Missing values can be minimised with
appropriate pilot work assessing and rectifying reasons for missing responses. It is necessary for credibility to provide detail of the extent of missing values and how missing values were handled; sometimes the extent of missing values leads to follow-up studies.

3.5.5 Cleaning of data

3.5.5.1 Quality assurance
The data that are entered in the computer software should be checked for correctness; a procedure called quality assurance. Typing errors of data input can be assessed by visually scanning the data grid for ‘unusual’ values, and descriptive tables and graphs can be used to visualise any oddities in the data. In the second stage of the quality assurance a proportion of the inputted data should be randomly selected and compared against the original data source (e.g. the hard copy questionnaire) or re-entered and the two databases compared.

3.5.5.2 Outliers
An outlier is an unusual data value compared to the rest of the sample. The concept of outliers is more often discussed in quantitative studies than in qualitative. Outliers can be identified visually in graphs; box-plots, scatter plots, line plots and stem-and-leaf plots where outliers are calculated based on assumptions of normal distributions of the sample.

Outliers can be numerically transformed by, for example, squaring or taking the log of the outlying value. This however, distorts the relationship between the outlier and the rest of the values and should be used with caution. Deleting outliers can potentially bias the sample while on the other hand keeping them within a small sample will do the same. The judgement when to exclude outliers is to be made by the investigator. In non-parametric statistical tests outliers are less of a problem as there is no assumption of normally distributed populations.
3.6 DATA ANALYSIS

This section incorporates several types of data analysis focusing on the advanced statistical analyses used in this project. The procedures when analysing qualitative data are also discussed.

3.6.1 Quantitative analysis

The objectives of the study and the types of data determine the appropriate statistical tests. In survey instruments, the scale on which the responses are collected determines the suitable statistical tests.

Descriptive statistics are used to describe the data obtained from the sample and are often part of the initial analysis. It is a collective name for parameters such as median, mean, range and standard deviations. Frequency tables provide a useful way to familiarise oneself with the data.

Statistical inference is the process of drawing conclusions from a sample about a wider population, taking into account the possible effect of chance (Coggon, 2001). Inferential statistics include calculation of probabilities and comparative tests such as correlations and associations (e.g. chi²-test). Associations are used to explore homogeneity of the sample examining whether two groups differ in relation to a variable. Depending on the distribution of the sample, whether it is normally distributed or not, parametric or non-parametric tests can be applied. T-tests and One-Way Analysis of Variance are common ways to investigate differences between means in normally distributed samples whereas the Mann-Whitney U-test and Kruskal-Wallis test make no assumption of distribution and are used for non-parametric data. No cut-off points apply to whether a sample is normally distributed and hence the decision is left to the investigator’s judgement. Categorical data can be investigated using chi² statistics and continuous data with Pearson’s r (parametric data) or Spearman’s rho (non-parametric data).
3.6.1.1 Cluster analysis

In order to explore and explain relationships in a sample it can be useful to arrange cases into groups that share similar attributes. There are different clustering techniques to group cases and their application is slightly different as described below.

Cluster analysis is a multivariate classification method where the aim is to reduce the number of cases (N) down to groups, or clusters (M) based on certain variables (p) and where M<N (Norman et al., 2000). Cluster analysis is used to explore new attributes of cases. The basic criterion for any clustering is the spatial distance between cases. The computing of clusters uses geometrical principles such as Euclidean distances where cases with similar attributes form a homogenous cluster. The variables determine the range of distance and cases that are near each other (that have similar attributes) will be allocated in the same cluster. In the calculations the processing programme looks for the most economical solution; the minimum number of calculations to form clusters where the within-cluster-distance is as small as possible and the between-cluster-distance is as great as possible. Cluster analysis is an exploratory method and the formed clusters are subject to the researcher's interpretation.

There are no standard procedures for determining the optimum or 'correct' number of clusters in a data set (Norman et al., 2000) but using several methods to determine the number of clusters increases the validity of the selected cluster solution. Repeated studies with the same sample or replication with a similar sample enhance the validity of the cluster solution.

There are three different types of cluster analysis that can be computed in the SPSS Software version 11.0; hierarchical cluster analysis (also called joining), two-way joining (block clustering), and K-means clustering. In this thesis hierarchical and K-means clustering methods were used. To determine whether the clusters are significantly different from each other, parametric or non-parametric tests can be undertaken.

Cluster analysis has been extensively used in a range of sciences such as medicine, physics and archaeology. The relation between pre-term birth and socioeconomic and psychological factors has been investigated with cluster analysis statistics and a few
publications used cluster analysis to determine medical and illicit drug consumption. The majority of studies were undertaken in the US. Only one published study was found that had used cluster analysis to identify usage of pharmacy services.

Two-step cluster analysis
A two-step cluster analysis utilises both continuous and categorical variables and the optimal number of clusters is suggested by computerisation. The requirements for this type of analysis are that the variables are independent, the continuous variables have a normal distribution and the categorical valuables have a multinomial distribution (SPSS 12.0.1, 2004).

Hierarchical cluster analysis
Hierarchical cluster analysis uses an algorithm that starts with each case in a separate cluster and combines clusters until only one is left. At each stage of the analysis, the criterion by which objects are separated is relaxed. At each step the two most similar clusters are linked until all of the objects are agglomerated. There are several methods that can be used to calculate the distances, for example, city-block distance, Chebychev distance and power distance. Distances are calculated according to different sets of rules which makes them more or less appropriate depending on the data for analysis. In this thesis, Eucliedian distances were computed which uses the geometric distances according to the below formula:

\[ \text{Distance } (x,y) = \sqrt{(x_i - y_i)^2} \]

The variables should be set on the same scale for robust clustering. In the single linkage method (also called nearest neighbour method) the distance between two clusters is determined by the distance of the two closest objects (nearest neighbours). This approach will string objects together to form clusters and the resulting clusters tend to represent long "chains." In complete linkage (also called furthest neighbour method), as was used in this thesis, agglomeration was determined by the shortest distance between the two cases that were furthest away in different clusters. This method is suitable when the cases form naturally distinct groups. The method proves inappropriate if the clusters form chain-like structures.
K-means cluster analysis

K-means cluster analysis attempts to identify homogeneous groups of cases based on selected variables (in this thesis, 6 questionnaire items). Variables must be set on a interval or ratio scale (SPSS, 12.0.1, 2004). The number of clusters is selected by the investigator and there are no satisfactory methods to determine the number of clusters suitable for a particular population (Norman et al., 2000). A good cluster analysis should be efficient (using as few clusters as possible) and effective (capturing both statistically and meaningful clusters). The statistical program will move cases in and out of the clusters until it has minimised the variability within clusters and maximised the variability between clusters. The number of iterations is the number of times the computer will re-calculate the cluster solution and the produced F-values indicates relative weight by each variable to discriminate between the clusters (SPSS 12.0.1, 2004). By definition, the F-value is a ratio of the ‘cluster mean square’ and the ‘error mean square’ explaining how much variance is due to error and how much variance comes from the difference in response. The higher the item F-value, the larger the contribution of that item to the separation of clusters. The program default option only includes cases with no missing values on the cluster items when performing calculations.

3.6.1.2 Time series analysis

Time series analysis has many utilities e.g. to identify patterns in a data sequence or to test the impact of an intervention or to forecast future trends. It has been used in disciplines such as economics, metrology and health sciences. Time series design is useful in situations when experimental study design with a control group is not feasible, such as the effect of media on a certain behaviour (e.g. the Watergate scandal and political opinions) or how the launch of a national guideline affects treatment (Yaffee and McGee, 2000). The times series analysis used in this thesis comprised Auto-Regressive Integrated Moving Average (ARIMA) and intervention analysis.

ARIMA analysis

ARIMA analysis is a type of time series analysis that has many utilities such as analysing historical information, to build models or to predict trends of performance;
examples include managing budgets via forecasting systems or investigating public opinions.

ARIMA is also known as the ARIMA \((p,d,q)\) model. There are no proven 'automatic' techniques to identify trend components in the time series data; the analysis is undertaken in several steps (SPSS Inc., 1993):

- A sequence graph is first drawn up to visualise the data
- Next, autocorrelation correlograms help to identify which ARIMA model should be applied. The autoregressive order \((p)\) is identified with an Autocorrelation Function (ACF) plot, corrected for correlated error; the order of differencing \((d)\) identifies if there is any seasonality in the trend, and the Partial Autocorrelation Function (PACF) plot identifies the Moving Average \((q)\); whether there are any internal errors or lagged shock effects.
- When an ARIMA model has been selected, the Fit of the model can be checked against the trend. Residuals should be evaluated and should be randomly fluctuating.

There is no one acceptable ARIMA model for all data, so the data must be tested in the above steps to identify a suitable model. A longer time sequence (above 50 observations) produces a more robust result than a shorter series (Robson, 2002). However, there is no set lower limit for the number of observations needed and judgement is left to the investigator (Yaffee and McGee, 2000). For shorter time series (10 observations) techniques for repeated measures analysis of variance can be utilised (Robson, 2002). These methods however, assume total independence of each observation which limits their application.

**Intervention analysis**

Intervention analysis is also recognised as interrupted time series analysis. The technique is useful to investigate change in a behaviour or trend when an event is introduced. To perform an intervention analysis, the data first must be described by a model such as ARIMA (SPSS Inc., 1993). The intervention is marked and divides the data into two sets; before and after the intervention. The intervention analysis assumes a 'closed system'; all external impact is ruled out. Such assumption has its limitations in real life settings where influences may be many and also unknown. In many cases no comparison group can be created e.g. when new evidence from a clinical trial is
launched. Therefore, intervention analysis provides a useful, yet imperfect tool for assessment of impact.

3.6.2 Qualitative analysis
The qualitative analysis process can consist of fewer or several steps incorporating little or more detail into the findings. Clear research objectives help to determine when to stop the analysis. The process often starts with familiarisation of the data by reading the transcripts. Statements that describe the same issue are coded into units. The labels of the codes can emerge during the coding process or can be pre-defined prior to the data collection. At this stage, there is usually little interpretation and more description of data; Miles and Huberman (1994) say that description of data is “making complicated things understandable by reducing them to their component parts”.

The next steps involve explaining the data; “making complicated things understandable by showing how their component parts fit together according to some rules” (Miles and Huberman, 1994). There are, in principle, two ways in which data can be explained; i) each code can be further divided into sub-codes and analysed in more detail or ii) the codes can be merged into larger units with a wider range of contents that forms themes. At each stage of analysis evaluation and interpretation of the data is undertaken. The themes can again be grouped together forming larger units; categories. This involves re-interpretation of the themes and their relationship. Concepts are developed from the categories in effort to explain its contents; concepts are also used for theory building or theory testing.

While intense engagement in the analysis allows for immersion in the data, there are benefits of having ‘wash-out’ periods during the analysis. Wash-out periods may enhance the objectivity of interpretation as the investigator becomes less immersed in the data and gets ‘new eyes’ on interpretation. According to grounded methodology, validity can be investigated by trying to disprove conclusions from analysis with additional interviews where participants are purposively selected. Although analysing qualitative data often involves interpretation, the researcher should strive for objectivity and avoid forming preconceived ideas.
3.7 APPROACH TO THE RESEARCH PROJECT

This section describes how this project was developed and undertaken to give the reader an overview of designing and undertaking a pragmatic project in a real-life setting, such as the NHS. ‘Real world’ research has often been described as ‘messy’ compared to traditional research where the environment can be controlled. In real world research there may be alternative hypotheses to those postulated and assumptions may (need to) be violated in statistical testing (Robson, 2002). It is held that primary care research is complex to undertake but urgently needed in order to improve effectiveness of practice (Foy et al., 2001).

3.7.1 Combining research methods

A multimethod approach was used in this thesis to describe and explain issues around prescribing. Multiple methods were used in hope of providing a fuller picture of the prescribing situation than could be achieved using one method only. Methods were selected depending on suitability and feasibility in accordance with the pragmatic approach that framed the project. Quantitative data contributed descriptions of phenomena while qualitative data provided explanations. Hence, both fixed and flexible methods were used in order to accommodate both the researcher’s and the participants’ perspectives. Fixed study designs typically focus on the researcher’s perspective while flexible designs tend to accommodate the participants’ perspectives.

3.7.1.1 Triangulation of data

The triangulation of data are described as “the combining of different types of approach, methods and/or data within the same research study” (Smith, 2002). The term triangulation originates from navigation (Smith, 2002) where the position of the vessel was repeatedly checked against a trig point in efforts to give an accurate position at sea. Triangulation was used in this thesis to aid explanation of phenomena and to validate the findings.

Triangulation is a powerful technique in that it assesses different data and methods against each other giving different perspectives on a research question. The technique is popular amongst researchers and is especially suitable for complex inquiries. Denzin
(1989) argued that using multiple methods (methodological triangulation) makes the researcher free from preconceptions and bias. Whilst it can be argued that a bias can still prevail despite using several methods, a greater number of methods diminish the risk of bias. In addition, triangulation aids validity by declaring the findings in multiple ways.

In spite of these potential benefits of triangulation, some researchers have expressed concerns about the use of different methodologies within the same study (e.g. qualitative observations and quantitative questionnaires) as they are founded on different philosophies and are methodologically distinct. Others think that triangulation helps to overcome the shortcoming of one method with the strengths of another. Those in doubt say that inaccuracies from one method can not be compensated for by another. Protagonists disagree and say that biases from one method can be identified by another. The research findings are however, to some extent, an artefact of the method used (Smith, 2002).

3.7.2 The main investigator and the materials

The principal investigator was commissioned by the two PCTs to undertake this project. The principal investigator had no previous experience of UK primary care and thus had no preconceptions and bias prior to the project. Funding was provided by the PCTs and the investigator was based at the university. By being detached from the collection sites, the investigator was potentially more likely to report unbiased findings and work according to planned strategies. The potential critique of being ‘detached’ included less opportunity for PCT personnel to incorporate their issues into the project, and hence to produce findings that could be less well founded in practice.

The pragmatic approach was reflected by regularly holding project board meetings where project issues were discussed and decisions were made. The PCT participants provided insights to practice and feasibility of suggestions from the researchers. Ideas and demands from the PCT team were incorporated in these meetings while email circulations provided opportunity for discussions between meetings.
Materials and Methods

3.8 MATERIALS

The materials in this project comprised two neighbouring PCTs (PCT1 and PCT2) in East London, and the GPs and pharmaceutical advisors working in those PCTs. An overview of the culture and populations of each PCT was prepared as well as a summary of their shared attributes. Demographic data described issues of the patient population e.g. measures of deprivation, ethnicity and health status. Organisational data described the type of PCT, the GPs and financial data. While similar data sets were sought for both PCTs, discrepancies between sets were common. In general, the principal investigator found it more difficult to retrieve and collect data from PCT2. Presented data was compiled from PCT1 and PCT2 Public Health Profiles (2001) unless otherwise stated.

3.8.1 Ethics approval

The project received ethical approval from the local Health Authority (reference number N/02/024). The approval covered all studies presented in this thesis. The principal researcher held an Honorary contract with both study PCTs and indemnity was given by both the PCTs and from the School of Pharmacy that also provided Data Protection according to the Data Protection Act.

3.8.2 Commonalities of the materials

3.8.2.1 Demographics in PCTs

The two PCTs had several characteristics in common, such as ethnically diverse and poor populations. Both PCTs were ranked amongst the poorest in the UK on income levels, educational achievements, unemployment and housing conditions; the average household income was £9,950 per annum in PCT2. It is widely known that there is a relationship between health and deprivation; lower social classes have higher mortality than the upper classes. Specific causes of death such as Coronary Heart Disease (CHD), lung cancer, suicide and accidents are also related to deprivation. Deprived patients have less access to health information which may cause inequalities in care and ultimately lead to a worse prognosis for deprived patient. A baby born in PCT1 is more than twice as likely to die post-natally as if she was born in Bexley in South-East London (Kings Fund, 2002).
The composition of a population affects the type of health services required and, hopefully, delivered. Patient demographics is therefore likely also to impact prescribing patterns. The argument that ‘an extreme population will require more resources’ was called on by PCT1.

Table 3.3 summarises the demographics of the patient populations in the PCTs together with some general data. The missing data in the table indicate the lack of standardised data records in the PCTs which provided difficulties for the investigator.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>PCT1</th>
<th>PCT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCT formed in</td>
<td>2001</td>
<td>2001</td>
</tr>
<tr>
<td>Type of PCT</td>
<td>Teaching PCT</td>
<td>Research PCT</td>
</tr>
<tr>
<td>Number of GP surgeries</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>Number of GPs</td>
<td>141</td>
<td>117</td>
</tr>
<tr>
<td>Turnover rate of GP lists</td>
<td></td>
<td>26%</td>
</tr>
<tr>
<td>Population</td>
<td>205,000</td>
<td>185,000</td>
</tr>
<tr>
<td>GP registered population</td>
<td>250,000</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>38% non-white (20% Black)</td>
<td>&lt;40% non-white</td>
</tr>
<tr>
<td>Birth rate (58/1,000 UK average)</td>
<td>83/1,000</td>
<td>83/1,000</td>
</tr>
<tr>
<td>Life expectancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK average: Men 75.2</td>
<td>Men 73.2</td>
<td>Men 72.7</td>
</tr>
<tr>
<td>UK average: Women 80.1</td>
<td></td>
<td>Women 79.6</td>
</tr>
<tr>
<td>Under 44’s (61% UK average)</td>
<td>72%</td>
<td>73%</td>
</tr>
<tr>
<td>Unemployment (rank in the UK)</td>
<td>18/354 (15%)</td>
<td>34/354 (22%)</td>
</tr>
<tr>
<td>Income deprived (rank in UK)</td>
<td>17/354</td>
<td>16/354</td>
</tr>
<tr>
<td>Smoking population (27% UK)</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>Bilingual school children</td>
<td></td>
<td>62%</td>
</tr>
</tbody>
</table>

From the table it can be concluded that PCT1 was slightly larger but that many of the population demographics were similar. The PCTs had existed for the same length of time but had slightly different foci on teaching and research.

The Jarman UPA is a measurement of deprivation that takes into account income, unemployment, quality of housing, housing overcrowding, lone parents and ethnicity. Only PCT2 had higher Jarman UPA score than PCT1 in the whole of England and Wales in 1996. The PCTs characterised their populations as being young, ethnically diverse, growing and experiencing deprivation, and as a consequence, poor health.

The overcrowding and bilingual environment for many pupils in the PCTs may in part explain why the success rates for GCSE/GNVQ attainment in English and mathematics and overall GCSE grades were lower in both PCTs compared to England as a whole.
The crime rate in PCT1 had decreased in recent years but there is still a ‘fear of crime’ in the area that affects everyday life, such as fear of going out; sixty-eight per cent of the population felt unsafe in certain areas in the PCT. It is thought to have an unfavourable effect on health, but the magnitude of the effect is difficult to establish.

3.8.2.2 Organisation in PCTs

Data on management structures were compiled as an indicator of organisational stability in the PCTs. It was proposed that vacant positions could adversely affect the stability, capacity and continuity of the organisation in managing the NHS agenda. Data were collected from the PCTs in spring 2003 by asking the pharmaceutical advisors which positions were filled (table 3.4). The grey-shaded areas showed where a post, at the time, was not filled. The table indicated that PCT1 had two more vacancies than PCT2 at the time of data collection.

<table>
<thead>
<tr>
<th>Position</th>
<th>PCT1</th>
<th>PCT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Governance Facilitator</td>
<td>Being appointed at present</td>
<td>Partly vacant</td>
</tr>
<tr>
<td>Commissioning Lead/Manager</td>
<td>Filled</td>
<td>Director of Commissioning &amp; Service Development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Filled</td>
</tr>
<tr>
<td>Director of Public Health</td>
<td>Director of Health Improvement</td>
<td>Director of Health Improvement</td>
</tr>
<tr>
<td></td>
<td>Filled</td>
<td>Filled</td>
</tr>
<tr>
<td>PCT Chairman</td>
<td>Filled</td>
<td>Filled</td>
</tr>
<tr>
<td>PCT Chief Executive</td>
<td>Filled</td>
<td>Filled</td>
</tr>
<tr>
<td>Pharmaceutical Advisor</td>
<td>Vacant (was vacant for over 1/2 year)</td>
<td>Head of Prescribing, Medicines &amp; Pharmacy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Filled</td>
</tr>
<tr>
<td>Primary Care Development Lead/Manager</td>
<td>Vacant</td>
<td>Head of Primary Care Development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Filled</td>
</tr>
<tr>
<td>Professional Executive Committee Chairman</td>
<td>Filled</td>
<td>Filled</td>
</tr>
<tr>
<td>Pharmacist member of Professional Executive Committee</td>
<td>To be appointed</td>
<td>Vacant</td>
</tr>
</tbody>
</table>

The table was adopted from Centre for Pharmacy Postgraduate Education (2002)
3.8.2 Demographic and organisational description of PCT1

3.8.2.1 Demographics in PCT1

Ethnicity
Thirty-eight per cent of the population was non-white; Black Caribbean and Black African being the two largest ethnic groups (11% and 9% respectively). Other ethnic groups were Indian, Pakistani, and Bangladeshi. Fifty per cent of the children under 4 years belonged to ethnic communities other than white. There had been a recent immigration from former Eastern Europe (classified as white), Jewish, Turkish and Kurdish people. The wide range of languages spoken in the PCT1 population was likely to have implications for health services; not all immigrants could communicate their health in English. The installed Telephone Interpreting service in East London was used most heavily by doctors in PCT1 (compared with PCT2 and another PCT within the SHA).

Age and birth rates
The number of young people was increasing with a birth rate of 83/1000 women. The teenage pregnancy rate was high. The rate of child immunization was well below national targets and infant mortality was the highest in London (8.9/1000 as compared to the lowest of 6.1/1000). Life expectancy was 2 years lower for men compared to England as a whole.

Mortality and illness
Mortality rates for under-65s were 38% higher than in the rest of the UK, largely due to high cancer and CHD mortality rates. Tuberculosis was five times as prevalent than in the rest of the country and beta thalassaemia or sickle cell disease was prevalent in 1 of 19 individuals in the PCT. There were exceptionally high rates of hospital admissions for mental health. Particular challenges of disease relating to the diverse ethnic population are presented in table 3.5.
Table 3.5 Conditions related to ethnicity of PCT1 population

<table>
<thead>
<tr>
<th>Condition</th>
<th>Implications for populations of certain ethnicities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronary Heart Disease</td>
<td>CHD is 40% higher in Southern Asian UK communities</td>
</tr>
<tr>
<td>Hypertension and stroke</td>
<td>Hypertension and stroke are 50% higher in African and African Caribbean UK populations</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Diabetes is approximately four times higher in Southern Asian UK populations; the PCT has three times higher mortality from diabetes compared to the national average</td>
</tr>
<tr>
<td>Mental illness</td>
<td>The rate of admission for serious mental illness is 2.5 times higher in the African Caribbean male population than in the white male population in the PCT</td>
</tr>
<tr>
<td>Smoking</td>
<td>The smoking rate of Turkish and Kurdish male population is as high as 48%</td>
</tr>
<tr>
<td>Sickle cell</td>
<td>Statistics say that one in ten African Caribbean people and one in five of West African people have sickle cell trait</td>
</tr>
<tr>
<td>Beta thalassaemia</td>
<td>One in seven of the Cypriot population have the beta thalassaemia trait</td>
</tr>
</tbody>
</table>

3.8.2.2 Organisation in PCT1

The PCT was established as a Teaching PCT in April, 2003. Teaching PCTs were created from 2002 and onwards in underprivileged areas where it was difficult to recruit and retain staff. The intention with Teaching PCTs was to provide attractive posts with clinical and research/teaching/development tasks in order to recruit qualified staff that were so much in demand in these PCTs. The local hospital was awarded three stars from the Commission for Health Improvement (since March 2004 incorporated into the Health Commission) and the PCT was give one star the first time this reward system was used. The PCT aimed to improve their services and were working according to 62 local targets as agreed by the Department of Health.

During the time of the research project a new Chief Pharmaceutical Advisor (CPA) was appointed. The resigning CPA had held the position for three years and it took more than half a year to recruit a new CPA. The prescribing team comprised two or three pharmacists during the project period. One of the pharmacists held a primary-secondary care interface position; the role in primary care focused on updating the local PCT formulary. The other support pharmacist was responsible for GP practice visits and educational outreach. The team was female except for the new CPA who was male.

GP surgeries

In 2001, the PCT had 56 GP practices employing 141 GPs. The GPs were younger than the London average. The PCT had a registered resident population of about 205,000 whereas the population registered with GPs was 250,000; thus GPs’ lists were inflated.
Reasons for inflated lists include that people have moved or registered with more than one GP or that the resident population estimates were inaccurate. The implications of inflated lists are, for example, that national screening and immunisation targets are more difficult to achieve; only one in four GP practices in PCT1 manage to meet the cervical and breast screening targets set by the NHS.

The PCT organisation found it hard to fill GP vacancies which was why the salaried GP employment scheme had been implemented. This attracted some new young GPs to the area but the PCT estimated that 30 additional GPs were needed to meet the health needs of the population.

The PCT Formulary
The PCT had produced a local formulary in conjunction with the local hospital that had no in-house formulary prior to this. An interface pharmacist was leading the collaborative work which took one year to complete (September 1999 to August 2000). The Chief Executive for the, then, PCG and local hospital representatives worked together in collecting evidence from both primary and secondary care; consultants, pharmacists and nurses all contributed with evidence. The development process was published in Health Services Journal, 2000 (see Walker, 2000). PACT data and current prescribing practice guided the development process; it was thought that if advice in the local formulary was ‘too distant’ from current prescribing practice the formulary would be neglected (personal communication, Formulary Manager, 06/08/02). Meetings were held but much of the correspondence was done via email. The formulary was first launched in a paper version and posted out to GP practices in August 2000. In January 2001 the electronic version of the formulary was installed on the PCT Intranet so GPs with Intranet could access this on-line. In the first review of the formulary (2003) more treatment advice was incorporated. The updated edition was posted out to all GPs at the end of 2003 and there were no launch activities of the new edition.

The PCT ran a Prescribing Incentive Scheme (PIS) every year during the project time period which was voluntary for GPs (further described in section 5.3.2). Medication reviews became part of the PIS and Community Pharmacist (CP) integration into GP practices were under way. Twelve CPs were sent to visit GP practices for prescribing support around the minor ailments scheme. There were regular meetings between the
Materials and Methods

four geographical areas that made up the PCT. The Prescribing Sub-Committee and the New Drugs Group had meetings periodically. The aim of the pharmacist prescribing team was to visit each practice once yearly. Prescribing activities in PCT1 are summarised in section 5.3.1.
3.8.3 Demographics and organisation of PCT2

3.8.3.1 Demographics in PCT2

Ethnicity
Just below 40% of the population belonged to ethnic communities other than white; communities of Kurds and Eastern Europeans were classified as white. The second largest ethnic community was Bangladeshi (27%). The Bangladeshi community was especially affected by housing overcrowding with some of the worst seen in England and Wales and double the rate of the London average. Half of these households contained six people or more and flats were often damp and lacked central heating. The homeless population was also large According to the Census 1991.

Seventy-eight languages were spoken in local schools and 62% of the school children spoke another language than English at home. Teaching staff from local schools estimated that only 11% of the children had good enough English proficiency not to require extra teaching support.

Age and birth rates
The PCT had an especially young population; 73% was under 44 years compared to 61% of the England and Wales average. Almost half of the children four years or younger were Bangladeshi (46%). The birth rate was exceptionally high with 83 live births per 1,000 women aged 15-44 compared with England and Wales; 58 per 1,000. The proportion of older people was declining, but old people were not dying at any greater rate, which produced a growing population.

There were high stillbirth rates but low underage pregnancy rates. Birth weights were lower than the England and Wales average suggesting sub-optimal health and living conditions during pregnancy. The average life expectancy was 72.7 years for men which was the lowest in London (Health in London, 2004) and 79.6 for women. This was 2.5 years (men) and 0.5 years (women) lower than England as a whole and the PCT ranked in the lower percentile of life expectancy.

The rate of asylum seekers and refugees in the PCT was high, and the population was largely mobile. Such a population provides challenges for meeting targets for immunisation and screening programmes and planning of new health services.
Mortality and illness
Partly explained by the ethnic mix, different disease patterns than in the rest of England and Wales were observed in PCT2. Diabetes rates were above national averages and tuberculosis rates five times higher than for England and Wales as a whole. There were higher levels of mental illness; schizophrenia affected 446.6 per 100,000 compared to 94.5 per 100,000 for England and Wales. Whilst mental illness is generally higher in deprived and inner city areas, the number of mental health admissions within this PCT was still higher than most other inner city areas. The death rates of CHD, stroke and HIV/AIDS were all well above the national averages. Cancer, accident mortality and suicide rates correlated with national averages or were lower.

3.8.3.2 Organisation in PCT2
The PCT was formed in April 2001 and is linked to the third largest teaching hospital in England which has a good reputation. Research departments within the Trust have projects running in primary and secondary care and there is a long tradition of integration of academic work in daily clinics. This exemplifies a cultural difference between the two PCTs in the project.

Throughout the project time frame the PCT prescribing team comprised two to four pharmacists. As in PCT1, an appointed pharmacist was responsible for developing the local PCT guideline. Two employees held part-time positions with the PCT and the hospital but none of the posts were so called interface posts. All pharmacists in the prescribing team had previously worked within secondary care. The whole prescribing team was female.

GP surgeries
There was a high turnover\(^1\) on GPs patient lists (26%), probably due to the largely mobile population. Over 10% of the population changed house address during a year. The part of London where the PCT is located is traditionally a first point of arrival for migrants and refugees. Refugees who have applied for asylum have the same rights to NHS care as UK citizens.

\(^1\) Turnover is an aggregate of additions and subtractions from the list as a percentage of the total list size.
Materials and Methods

The PCT had 15 single-handed practices (36%) and a similar proportion of group practices (17; 40%). The PCT had Bengali GPs which benefited the Bengali population as only 38% of the Bengali population understood English ‘well’ or ‘fairly well’ and only 27% could read more than ‘a little’ English. Language difficulties can have a big impact on patients’ understanding of and management of medicines.

The local PCT guideline
The PCT decided to construct a local guideline instead of a formulary. There were discussions between primary and secondary care of a joint authorship but at the time, there were feelings that the culture was too immature to support such collaboration (personal communication, Chief Pharmacist, 12/08/02). The chapters in the guideline were developed one by one starting with the gastrointestinal chapter followed by the antibiotic chapter. Each chapter was implemented as and when ready. The guidelines were set in flow-chart formats and could be accessed via the PCT Homepage. The guideline comprised a ring-binder with a loose pages system and was handed out at launch meetings, which meant that only GPs who attended those launch meetings received a paper version of the guideline. The reason for this approach was that the PCT wanted to know who had attended the meetings and who hadn’t (Personal communication, Prescribing Advisor PCT2, 05/02/02). The advisors had also drawn on evidence from literature which said that posted material unaccompanied with implementation activities was likely to be ignored.

A Prescribing Incentive Scheme (PIS) was run every year during the project time period and participation was voluntary for GPs (further described in section 5.3.2). Other prescribing activities that were run by the PCT are summarised in section 5.3.1.
CHAPTER 4

INVESTIGATING PERCEPTIONS OF PRESCRIBING
4.1 INTRODUCTION

From the literature review in chapter one it can be concluded that PCTs have a central role in prescribing management with responsibilities of drug budgets and provision of advice and support to GPs. Evidence suggests that prescribing is a complex issue; influences are many and varied and prescribers respond differently to initiatives. Factors that can influence prescribing behaviour of GPs included guidelines and formularies, commercial influences, incentive schemes, feedback on prescribing via PACT data, prescribing advisors, patient expectations and demography, and practice characteristics such as size. With this background in mind, chapter four sets out to describe the first study in the project; the survey (figure 4.1).

The survey investigated perceptions of prescribing influence of GPs in two PCTs in East London. A postal questionnaire was deemed suitable for reaching the whole population with limited resource while generating a satisfactory level of data. The survey was repeated with the same population approximately two years later to assure reliability of the results generated in the first survey. For this purpose, a shortened version of the questionnaire satisfied the proposed investigations. A small sample of the GPs in the repeated survey participated in an interview relating to the issues used for cluster analysis. To assess the reliability of the questionnaire items these GPs were also asked to fill out the questionnaire again, after the interview. The two surveys are
presented in parallel throughout the chapter and subsequent interviews are presented at the end (figure 4.2).

Figure 4.2 Description of the two survey studies

4.1.1 Aims
The aims of this study were to describe the perceptions of prescribing influences of a GP sample and to relate these perceptions with demographics and characteristics of the sample. The repeated survey aimed to test the reliability of the questionnaire items and subsequent interviews to validate findings from the surveys.

4.1.2 Objectives
In order to meet these aims the following objectives were identified:

i. To develop a questionnaire to describe GPs’ perceptions of prescribing influences

ii. To use this questionnaire to describe GPs’ perceptions of prescribing in a sample

iii. To relate GPs’ demographics and characteristics to their perceptions of prescribing influence

iv. To test the reliability of the questionnaire items used in the first study through a repeated survey

v. To test the validity of the findings from the surveys through a semi-structured interview

vi. To seek deeper knowledge around the questionnaire items used for cluster analysis

4.1.3 Working hypothesis
The working hypothesis for the studies in chapter four was that “GPs’ perceptions of prescribing could be grouped and related to their demographics, characteristics and
Investigating perceptions of prescribing: Introduction

prescribing behaviours".
4.2 METHODS

4.2.1 Developing the questionnaire

The principal investigator developed the first questionnaire schedule (Appendix I) drawing on various sources; ideas from the literature (e.g. influence from medical representatives and formularies); specific requests from the PCT prescribing teams (e.g. opinions of local formularies and guidelines) and ideas generated in discussions with other independent researchers.

The questionnaire had three main sections, which broadly comprised;

(i) Demographics and characteristics of the respondent
(ii) 16 statements about influences on the respondent's prescribing behaviour (labelled s1-s16, s = 'statement')
(iii) 14 statements and questions that concerned attitudes towards the local PCT formulary (labelled f1-f14, f = 'formulary' and other items)

The questionnaire schedule asked for GPs' perceptions of influence on their own prescribing behaviour. Perceptions may or may not reflect truth; a GP may think he is influenced by a certain factor when in fact actual influence was due to another source. The schedule did not incorporate all potential influences on prescribing as, i) there was no record of all factors that influenced prescribing, ii) the length of the questionnaire would be excessive as the number of influences may be as many as there are GPs.

Upon advice from the PCT representatives on the project board, the questionnaire was made anonymous but gave an option to declare name of practice if the respondent so wanted. The reason to make the questionnaire anonymous was not to violate response rates; PCT representatives thought that if name was mandatory many GPs simply would not respond. In the repeated survey (Appendix II) the respondents were asked to provide not only the name of practice but so also their own name. This was necessary in order to link responses to a Health Authority database containing details of each GP in the Trust such as age, nationality etc. and the size of practice they worked in.

Most statements were worded in first person to invite the respondents to give their own perceptions. To record GPs' perceptions of prescribing influence items relating to such
qualities were scored on a 5-step Likert scale ‘strongly disagree’, ‘disagree’, ‘neither
nor’, ‘agree’ and ‘strongly agree’. Items f8-f11 were set on a dichotomous scale; “yes”
and “no” and a space for written comments was provided below each item. Items f12-
f14 were set on two different 4-step scales relating to frequency of activity; ‘how often
do you...’). Respondents were also encouraged to give additional comments on a few
items (s16 and f8-f11). The purpose of these items was to give an opportunity for the
responder to expand on their perceptions and so also to validate the questionnaire items.

Face validity was sought by discussing the questionnaire items with fellow researchers
and amending accordingly. Circulating the schedule amongst PAs and the prescribing
board in both PCTs backed content validity. Content validity was enhanced by
comparing the items on the questionnaire with published literature. The questionnaire
items were tailored to the different priorities and preferences of the PCTs which was
why there were a few minor differences between the questionnaire schedules in each
PCT.

The repeated survey used six of the questionnaire items from the first schedule (s7, s8,
s9, f12, f13, f14). The six items were selected on the basis of the analysis of the initial
questionnaire. The wordings and style of the items were the same as in the initial
questionnaire (Appendix II). A small sample of the responding GPs was asked to fill out
the same 6-item questionnaire a second time in order to assess reliability.

4.2.2 Piloting the questionnaire
The questionnaire was piloted in both PCTs; the PAs presented them in the local
prescribing committee and the area prescribing committee which have GPs as members.
The repeated questionnaire was not piloted as it utilised a set of questions from the
initial questionnaire.

4.2.3 Distributing the questionnaire
The questionnaire was posted out to all GPs in both PCTs using each PCT’s letter
headed paper (autumn 2001). Mail distribution was deemed suitable in order to reach
the whole population with limited resources. As the questionnaire was anonymous,
reminders had to be sent to the whole population. The first reminder was sent two weeks
after the initial mailing and the second reminder was sent about two weeks after the first reminder. Responses were collected until the beginning of 2002.

The repeated questionnaire was distributed via mail on School of Pharmacy letter headed paper (spring 2004) and reminders were sent to non-responders only. The first reminder was sent two weeks after the first mailing and the second reminder two weeks after the first reminder. The collection of the questionnaires was stopped two weeks after the second reminder.

4.2.4 Coding the responses

The questionnaire was coded and analysed using Statistical Package for Social Sciences (SPSS) Version 11.0, which was at a later stage in the study updated to the 12.01 version. The Likert scale was scored from 1 to 5 where 'strongly disagree' was coded as 1 and 'strongly agree' was coded as 5. The dichotomous items were coded on a two step scale (0 and 1) and items f12-f14 were coded on a 4 step scale (1 to 4) where 'high frequency of doing something' was scored as 4. Scores 1 and 2, and 4 and 5 were at times collapsed to make response groups larger (e.g. in section 4.3.6 and 4.3.7). Whilst it is acknowledged that 'neither nor' and 'uncertain' mean different things in linguistic terms, in this thesis however, they have been used interchangeably in order to facilitate the constructions of sentences and to vary the language. Both terms refer to the 'middle' response alternative on the Likert scale, which was scored as 3. This middle option was discarded in bivariate analysis.

Quality control of coded data was undertaken by checking for typing and coding errors after the data had been entered into the SPSS grid. Frequency tables were produced in order to visualise typing errors and to identify any coding errors, a sample of questionnaires were randomly selected and the computer file was compared with the hard copy.

4.2.5 Analysis of the questionnaire

4.2.5.1 Descriptive and inferential statistics

Associations between items were investigated in cross tabulations and further explored with statistical testing; chi²-test and bivariate correlations were investigated with the non-parametric Spearman's rho. Non-parametric Mann-Whitney U-test for two
independent samples was used to explore correlations between items and to investigate differences between groups within the population and between the PCTs.

4.2.5.2 Cluster Analysis

As described in section 3.6.1.1, cluster analysis can be used to identify groups, or clusters, of respondents. The idea to use clustering methods emerged when the findings showed that demographics and characteristics of GPs related to certain perceptions of prescribing influence. The two-step cluster analysis could not be applied as the distributions of the items were not normal. The data fulfilled the requirements for the hierarchical and K-means cluster analyses.

Nine questionnaire items were initially selected for the hierarchical cluster analysis (s7, s8, s9, s10, s11, f8, f12, f13, f14). These items had explained differences in GPs' perceptions of prescribing in inferential analyses. A dendrogram was produced to visualise the number of clusters in the sample. An alternative method to investigate number of clusters is to randomly select two sub-samples from the sample and compare the cluster solutions between these two sub-samples. Using multiple methods to determine the optimum number of clusters makes the process more objective. As the purpose in the repeated study was to assess the reliability of the initial study there was no further exploration of the number of clusters in the repeated study.

The nine items were put into the K-means cluster analysis. F-values generated in the cluster analysis were used to guide the final selection of items for clustering (table 4.1). The maximum number of iterations of the final solution of the cluster model was set to twenty and pair-wise exclusion and Euclidean distances were used as defaults. As the purpose was to investigate the hypothesis, only GPs with full responses to the 6 cluster items were included.

<table>
<thead>
<tr>
<th>Table 4.1 Items used in the final K-means cluster analysis model</th>
</tr>
</thead>
<tbody>
<tr>
<td>s7. Discussing prescribing issues with peers influences my prescribing</td>
</tr>
<tr>
<td>s8. Visits by PCT/HA Pharmaceutical Advisers influence my prescribing</td>
</tr>
<tr>
<td>s9. Visits from drug representatives influences my prescribing</td>
</tr>
<tr>
<td>f12. How often do PCT/HA Pharmaceutical Advisers visit you?</td>
</tr>
<tr>
<td>f13. How often do Drug Representatives visit you?</td>
</tr>
<tr>
<td>f14. How often do you look in the local formulary?</td>
</tr>
</tbody>
</table>
By converting the questionnaire scores to standardised z-scores the shortcoming of using different scales in the questionnaire was minimized. Kruskal-Wallis test was employed to investigate differences in perceptions between clusters by comparing the summarised mean scores in each cluster on the 6 items. In order to assess the reliability of the cluster model the calculations mentioned above were re-iterated in the same way for the repeated study.

Abbreviated phrases of the 6 items were used to decrease repetition and to keep words to a minimum (table 4.2). While efforts were made to be consistent, abbreviated phrases varied slightly in graphs due to considerations of layout.

<table>
<thead>
<tr>
<th>Item label on first questionnaire</th>
<th>Item label on repeated questionnaire</th>
<th>Item as written on questionnaires</th>
<th>Examples of abbreviated phrases used in the thesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>s7</td>
<td>q1</td>
<td>Discussing prescribing issues with peers influences my prescribing</td>
<td>Peer influence</td>
</tr>
<tr>
<td>s8</td>
<td>q2</td>
<td>Visits by PCT/HA Pharmaceutical Advisers influence my prescribing</td>
<td>Influence from PAs Pharmaceutical advisor influence</td>
</tr>
<tr>
<td>s9</td>
<td>q3</td>
<td>Visits from drug representatives influences my prescribing</td>
<td>Influence from drug reps Drug representative influence</td>
</tr>
<tr>
<td>f12</td>
<td>q4</td>
<td>How often do you look in the local formulary?</td>
<td>Frequency of looking in the local formulary Frequency of formulary usage</td>
</tr>
<tr>
<td>f13</td>
<td>q5</td>
<td>How often do PCT/HA Pharmaceutical Advisers visit you?</td>
<td>Visits from PAs Frequency of pharmaceutical advisor visits</td>
</tr>
<tr>
<td>f14</td>
<td>q6</td>
<td>How often do Drug Representatives visit you?</td>
<td>Visits from drug reps Frequency of drug representative visits</td>
</tr>
</tbody>
</table>

INTERVIEW PREPARATION

4.2.6 Developing and organising the interviews

The repeated survey was followed up with face-to-face interviews with a self-selected sample of GPs in order to assess the validity of the findings from the surveys and to gain more knowledge about perceptions of GPs allocated in different clusters. An interview schedule (Appendix III) was constructed to further explore the items that were used in the cluster analysis; prescribing influences from peers, pharmaceutical advisors (PAs), drug representatives and local formularies (figure 4.3). As a final question in the interviews GPs were asked whether they thought that different GPs prescribed
differently. The purpose of this question was to see if GPs recognised that different GPs may have different prescribing traditions and if so, the possible reasons for this.

The GPs volunteered for the interviews through an invitation sent together with the repeated questionnaire. In efforts to capture opinions from GPs from all three clusters, interviewees were selected based on cluster memberships. As the selection of interviewees began one week before the collection period of the repeated survey was over, the selection were based on a preliminary cluster solution. At the time of the analysis of the interviews the final cluster solution had been generated. The interview schedule was piloted with two self-selected GPs.

The selected GPs were contacted by phone and a suitable time and place for the interview was arranged. The interviews were recorded on mini-discs after seeking consent from the participants. This allowed verbatim transcription so that the data could be analysed comprehensively. At the end of the interview the GPs were asked to fill out the same 6-item questionnaire. The interviews were performed by a Master of Pharmacy student under close supervision by the principal investigator.

4.2.7 Coding and analysing the interviews
The interviews were coded in the qualitative data analysis software NVivo version 1.1. The 24 primary codes that were created were based on the questions from the interview
schedule (table 4.3). Responses were contrasted between clusters as well as between GPs that belonged to the same cluster. The process of analysis followed the same procedure as presented in section 6.3.4.

Table 4.3 Primary codes and description of code contents

<table>
<thead>
<tr>
<th>Codes and themes in NVivo</th>
<th>Contents of code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theme: Peers</strong></td>
<td></td>
</tr>
<tr>
<td>Discuss with peers</td>
<td>Whether GPs discussed with peers; for what reason and frequency of discussions</td>
</tr>
<tr>
<td>Who</td>
<td>Who the GP considered as 'peers'</td>
</tr>
<tr>
<td>How peer influence</td>
<td>How peers influenced their prescribing</td>
</tr>
<tr>
<td>Peers + or -</td>
<td>GP's view on PA influence</td>
</tr>
<tr>
<td>Increase influence from peer</td>
<td>GP's suggestion on how to increase peer influence</td>
</tr>
<tr>
<td>Example of peer influence</td>
<td>An example of a situation where peers had influenced the interviewee's prescribing</td>
</tr>
<tr>
<td><strong>Theme: PAs</strong></td>
<td></td>
</tr>
<tr>
<td>See PAs</td>
<td>Whether GPs were meeting the PAs and if so why and how often</td>
</tr>
<tr>
<td>Phone/email contact</td>
<td>Apart from seeing PA face-to-face; did GPs contact them by phone or email</td>
</tr>
<tr>
<td>How PAs influence</td>
<td>How pharmaceutical advisors influenced their prescribing</td>
</tr>
<tr>
<td>PA influence + or -</td>
<td>GP's view on PA influence</td>
</tr>
<tr>
<td>Increase influence from PA</td>
<td>GP's suggestion of how to increase prescribing influence from pharmaceutical advisors and GP's views on having more visits from them</td>
</tr>
<tr>
<td>Example of PA influence</td>
<td>An example of a situation where a PA had influenced the interviewee's prescribing</td>
</tr>
<tr>
<td><strong>Theme: Drug representatives</strong></td>
<td></td>
</tr>
<tr>
<td>See drug representatives</td>
<td>Whether GP saw drug representatives either in or outside their surgery. The reasons for this, and if yes, what they discussed and how often this happened</td>
</tr>
<tr>
<td>How drug representatives influence</td>
<td>How drug representatives influenced their prescribing</td>
</tr>
<tr>
<td>Opinion of drug representatives</td>
<td>How influence from drug representatives were perceived. GP's view of provision of prescribing information from drug representatives</td>
</tr>
<tr>
<td>Practice policy</td>
<td>GP's view on a practice policy that does not allow GPs to see drug representatives</td>
</tr>
<tr>
<td>Example of influence</td>
<td>An example of a situation where a drug representatives had influenced the interviewee's prescribing</td>
</tr>
<tr>
<td><strong>Theme: Local formulary</strong></td>
<td></td>
</tr>
<tr>
<td>Formulary usage</td>
<td>How often the GP used the local formulary</td>
</tr>
<tr>
<td>Define formulary</td>
<td>What 'local formulary' the GP referred to as the local formulary</td>
</tr>
<tr>
<td>How formulary influence</td>
<td>In what way the formulary influenced their prescribing</td>
</tr>
<tr>
<td>Any improvement</td>
<td>GP's suggestion for potential improvement of the local formulary</td>
</tr>
<tr>
<td>Example of influence by formularies</td>
<td>An example of a situation where the local formulary had influenced the interviewee's prescribing</td>
</tr>
<tr>
<td><strong>Theme: Other</strong></td>
<td></td>
</tr>
<tr>
<td>GPs different prescribing</td>
<td>GP's opinion about variations in prescribing between GPs and if so, the reasons for different prescribing for the same patient case</td>
</tr>
<tr>
<td>Additional comments</td>
<td>Any additional information about prescribing that the GP felt they wanted to express</td>
</tr>
</tbody>
</table>
4.2.8 Presentation of results from the interviews
The results from the interviews were related to the mean scores of each of the 6 items in the repeated questionnaire. The reason for comparing with scores of the repeated and not the first survey was that the former was closer in time for the interviews. Key issues of each theme were illustrated with quotes. The identity of reported quotes was given as GP identification number; cluster membership, PCT and gender, for example (GP27;C1.1;PCT1;M). As is common in interview studies the results and discussion were presented in the same section (Smith, 2002).
4.3 RESULTS

This section describes the results from the questionnaires starting with the response rates and data management (e.g. coding and quality control). The analysis of results from questionnaires are split into three main sections; i) descriptive statistics where demographics and frequencies on items are presented, ii) inferential analysis where associations and correlations between items are explored and finally, iii) the cluster analysis. The cluster solutions from the first and repeated questionnaires were compared and further explored in the interviews; presented last in the result section.

4.3.1 Sample size

The piloting of the questionnaire generated no major changes. Of the 271 posted questionnaires, 185 were returned giving an overall response of 68% (table 4.4). The responses from PCT1 and PCT2 were similar. There were 104 questionnaires returned from PCT1 and 81 from PCT2 giving the proportion of 0.56:0.44 respondents from PCT1 and PCT2. Non-responder bias was not considered an issue due to the satisfactory response rate, and thus no non-responder follow-up was performed.

Of the 304 questionnaires sent out in the repeated study, 73 (24%) were initially returned. The two reminders generated 24 and 27 responses respectively. In total 124 questionnaires were completed and returned but three of the respondents had returned the questionnaire twice. Hence, the number of responding GPs was 121 which gave a response rate of 40% (table 4.4). A similar response rate was received from each PCT; 62 (51%) of the questionnaires came from PCT1 and 53 (44%) from PCT2. Although the response rate to the repeated questionnaire was 40% the sample seemed to be representative of the populations as demographics from the repeated survey were similar to those of the first survey (table 4.6).

<table>
<thead>
<tr>
<th>Category</th>
<th>Distributed questionnaires</th>
<th>Number of responses</th>
<th>Disclosed identity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCT1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First questionnaire</td>
<td>154 (100%)</td>
<td>104 (68%)</td>
<td>Yes 68 (65%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No 36 (35%)</td>
</tr>
<tr>
<td><strong>PCT2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First questionnaire</td>
<td>117 (100%)</td>
<td>81 (69%)</td>
<td>Yes 47 (58%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No 34 (42%)</td>
</tr>
<tr>
<td><strong>Whole sample</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First questionnaire</td>
<td>271 (100%)</td>
<td>185 (68%)</td>
<td>Yes 115 (62%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No 70 (38%)</td>
</tr>
</tbody>
</table>
Investigating perceptions of prescribing: Results

<table>
<thead>
<tr>
<th>PCT1</th>
<th>Repeated questionnaire</th>
<th>161 (100%)</th>
<th>62 (39%)</th>
<th>Yes 62 (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No 0 (0%)</td>
</tr>
<tr>
<td>PCT2</td>
<td>Repeated questionnaire</td>
<td>143 (100%)</td>
<td>53 (37%)</td>
<td>Yes 53 (100%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No 0 (0%)</td>
</tr>
<tr>
<td>Whole sample</td>
<td>Repeated questionnaire</td>
<td>304 (100%)</td>
<td>121 (40%)</td>
<td>Yes 115 (95%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No 6 (5%)</td>
</tr>
</tbody>
</table>

### 4.3.2 Identification of responder practice

In the first survey it was optional for respondents to leave their practice name, but over half of them did so anyway (115; 62%). The proportions of practices that disclosed their identity from each of the two PCTs were similar (table 4.4). In the repeated survey all but six respondents gave their names and practice names (5%) (table 4.4).

### 4.3.3 Quality control

Frequency tables showed the expected ranges of coded data and thus no typing errors were detected. Fourteen questionnaires (√185 = 13.6) were randomly selected to check for correctness of coding by comparing the computer file with the hard copy. No coding errors were found; accurate data entry was therefore assumed. The same procedure for quality control was undertaken in the repeated survey; accurate data could be assumed after no errors were found.

### 4.3.4 Reliability of the questionnaire

The reliability of the questionnaire was assessed with the 10 GPs who agreed to participate in the interview. These GPs were asked to fill out the repeated questionnaire at the end of the interview which made the time span between completing the first and second questionnaires approximately 4 to 6 weeks. Three additional GPs that did not participate in the interviews but who had filled in the questionnaire twice were also included in the reliability analysis. The sample size of n=13 GPs rendered a kappa-based reliability analysis less meaningful. A more pragmatic approach was to manually compare GP responses to the first and second questionnaire via a spreadsheet.

Two of the interviewed GPs gave exactly the same response to all items on both questionnaires. None of the GPs differed in the response to the item “How often do drug representatives visit you?” and only two GPs responded differently to “Visits from drug representatives influence my prescribing”. Such consistency in responses may imply that GPs have firm opinions of drug representatives. On the remaining items between
eight and nine of the GPs responded the same the first and second time. Only 27% responses were different between the first and second response. If the responses “strongly agree” was collapsed with “agree” and “strongly disagree” with “disagree” the total change was 22%. Thus, approximately one in five responses changed which was translated as good reliability of the survey. GPs were thought not to have remembered exactly what they answered the first and second time as the time span was 6-8 weeks.

4.3.5 Quality assurance

Overall, there were few missing values on the items regarding influence of prescribing (s1-s15) (table 4.5). Number of missing values was higher on the latter part of the questionnaire that concerned the local PCT formulary/guideline (items f1-f14). The reason for the higher number of missing values on the items relating to local formularies/guidelines could indicate that this subject was less well understood or interesting to the respondents. Follow-ups of missing values in the order of 10% of the total sample were not undertaken whereas item f8, that had the highest frequency of missing values (18%), was subject to further investigations (section 4.3.8).

<table>
<thead>
<tr>
<th>Questionnaire item</th>
<th>Response First</th>
<th>Missing (%)</th>
<th>Response</th>
<th>Missing (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>s1</td>
<td>184</td>
<td>1 (0.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s2</td>
<td>185</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s3</td>
<td>183</td>
<td>21.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s4</td>
<td>185</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s6</td>
<td>184</td>
<td>10.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s7</td>
<td>184</td>
<td>10.5</td>
<td>120</td>
<td>1 (0.8)</td>
</tr>
<tr>
<td>s8</td>
<td>182</td>
<td>31.6</td>
<td>120</td>
<td>1 (0.8)</td>
</tr>
<tr>
<td>s9</td>
<td>181</td>
<td>4 (2.2)</td>
<td>113</td>
<td>8 (6.6)</td>
</tr>
<tr>
<td>s10</td>
<td>183</td>
<td>2 (1.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s11</td>
<td>183</td>
<td>2 (1.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s13</td>
<td>185</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s14</td>
<td>185</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s15</td>
<td>185</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f1</td>
<td>166</td>
<td>19 (10.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f4</td>
<td>167</td>
<td>18 (9.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f5</td>
<td>166</td>
<td>19 (10.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f6</td>
<td>162</td>
<td>23 (12.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f7</td>
<td>167</td>
<td>18 (9.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f8</td>
<td>151</td>
<td>34 (18.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f9</td>
<td>170</td>
<td>15 (8.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f10</td>
<td>167</td>
<td>18 (9.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f11</td>
<td>163</td>
<td>22 (11.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f12</td>
<td>164</td>
<td>21 (11.4)</td>
<td>119</td>
<td>2 (1.7)</td>
</tr>
<tr>
<td>f13</td>
<td>170</td>
<td>15 (8.1)</td>
<td>117</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>f14</td>
<td>185</td>
<td>0 (0)</td>
<td>121</td>
<td>1 (0)</td>
</tr>
</tbody>
</table>

Bold marks the six items that were used in the repeated questionnaire.
4.3.6 Descriptive analysis

4.3.6.1 Demographics and characteristics

Demographics and characteristics from the first and repeated sample were displayed and compared, and the two PCTs were also contrasted. The reason for comparing demographics and characteristics was to assess similarities between the samples. Data on demographics and characteristics for the repeated questionnaire was received from the Strategic Health Authority while the first questionnaire relied on data reported by the responding GPs. Thus, there were discrepancies in how the data were collected and what the data comprised as seen in table 4.6. Therefore, not all parameters could be compared between the first and repeated samples. These issues are further discussed in the limitations of this chapter. The first sample is described before the comparisons are made with the repeated sample.

The demographics in the sample from PCT1 and PCT2 were similar in the first survey. The only two differences worth mentioning were that an additional seven percent disclosed their identity in PCT1 than in PCT2, and PCT2 had a slightly larger single-handed population (9; 16% compared to 5; 5%). Subsequent statistical testing declared no relationship between being single-handed and disclosure of identity. There were more male than female respondents in the full sample (109; 59%) (table 4.6). About half of the respondents worked in a group practice (95; 51%); small and double-handed practices were the second most common practice size (27; 15% and 25; 14% respectively). Over half the practices were teaching practices (101; 55%) while 25 (14%) left no details about teaching status.

Respondents in the first survey reported more non-clinical than clinical support staff working in the practices; the median values were 7 WTE non-clinical staff and 3 WTE clinical support staff. Fellow GPs that worked in the same practice were not included in the count, as the intention was to be able to compare clinical support from other disciplines (e.g. nurses, pharmacists, and dieticians).
Table 4.6 Summary of sample demographics and characteristics from the both questionnaires:
Comparison between PCTs.

<table>
<thead>
<tr>
<th>Category</th>
<th>Response measure</th>
<th>PCT1 First questionnaire Frequency (%)</th>
<th>PCT2 First questionnaire Frequency (%)</th>
<th>Whole sample First questionnaire Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>62 (60%)</td>
<td>47 (58%)</td>
<td>109 (59%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>42 (40%)</td>
<td>34 (42%)</td>
<td>76 (41%)</td>
</tr>
<tr>
<td>Size of practice</td>
<td>Single-handed</td>
<td>5 (5%)</td>
<td>9 (16%)</td>
<td>14 (8%)</td>
</tr>
<tr>
<td></td>
<td>Double-handed</td>
<td>19 (18%)</td>
<td>6 (11%)</td>
<td>25 (14%)</td>
</tr>
<tr>
<td></td>
<td>Small practice</td>
<td>19 (18%)</td>
<td>8 (14%)</td>
<td>27 (15%)</td>
</tr>
<tr>
<td></td>
<td>Group practice</td>
<td>61 (59%)</td>
<td>34 (60%)</td>
<td>95 (51%)</td>
</tr>
<tr>
<td>Teaching Practice</td>
<td>Yes</td>
<td>59 (57%)</td>
<td>42 (52%)</td>
<td>101 (55%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>45 (43%)</td>
<td>39 (48%)</td>
<td>84 (45%)</td>
</tr>
<tr>
<td>Number of non-clinical staff</td>
<td>Median</td>
<td>6 WTE</td>
<td>7 WTE</td>
<td>6 WTE*</td>
</tr>
<tr>
<td>Number of clinical staff</td>
<td>Median</td>
<td>2 WTE</td>
<td>3 WTE</td>
<td>3 WTE</td>
</tr>
<tr>
<td>Year of qualification</td>
<td>50s, 60s, 70s</td>
<td>29 (31%)</td>
<td>30 (41%)</td>
<td>59 (35%)</td>
</tr>
<tr>
<td></td>
<td>80s, 90s</td>
<td>65 (69%)</td>
<td>44 (59%)</td>
<td>109 (65%)</td>
</tr>
<tr>
<td>Length of time practising as a GP</td>
<td>Median</td>
<td>11 years</td>
<td>10 years</td>
<td>11 years</td>
</tr>
<tr>
<td>Length of time in this locality</td>
<td>Median</td>
<td>10 years</td>
<td>8 years</td>
<td>10 years</td>
</tr>
<tr>
<td>The same time practising as a GP and practising in this locality</td>
<td>53 (51%)</td>
<td>39 (48%)</td>
<td>92 (50%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Response measure</th>
<th>PCT1 Repeated questionnaire Frequency (%)</th>
<th>PCT2 Repeated questionnaire Frequency (%)</th>
<th>Whole sample Repeated questionnaire Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>28 (46%)</td>
<td>20 (42%)</td>
<td>48 (44%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>33 (54%)</td>
<td>28 (58%)</td>
<td>61 (56%)</td>
</tr>
<tr>
<td>Partners in practice</td>
<td>Median</td>
<td>4</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>1-8</td>
<td>1-8</td>
<td>1-8</td>
</tr>
<tr>
<td>Teaching Practice</td>
<td>Yes</td>
<td>33 (56%)</td>
<td>27 (56%)</td>
<td>60 (56%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>26 (44%)</td>
<td>21 (44%)</td>
<td>47 (44%)</td>
</tr>
<tr>
<td>Administrative</td>
<td>Median</td>
<td>12 WTE</td>
<td>13 WTE</td>
<td>12 WTE*</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>7-21</td>
<td>4-16</td>
<td>4-21</td>
</tr>
<tr>
<td>Number of clinical staff</td>
<td>Median</td>
<td>3 WTE</td>
<td>3 WTE</td>
<td>3 WTE</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>1-8</td>
<td>1-5</td>
<td>1-8</td>
</tr>
<tr>
<td>Year of qualification*</td>
<td>50s, 60s</td>
<td>9 (19%)</td>
<td>9 (24%)</td>
<td>18 (21%)</td>
</tr>
<tr>
<td></td>
<td>70s, 80s, 90s</td>
<td>36 (81%)</td>
<td>28 (76%)</td>
<td>64 (79%)</td>
</tr>
<tr>
<td>Age</td>
<td>Median</td>
<td>44 years</td>
<td>43 years</td>
<td>43.5 years</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>28-72</td>
<td>27-68</td>
<td>27-72</td>
</tr>
<tr>
<td>Length of time practising as a GP</td>
<td>Median</td>
<td>17 years</td>
<td>16 years</td>
<td>16 years</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>3-29</td>
<td>4-33</td>
<td>3-33</td>
</tr>
</tbody>
</table>

*WTE = Whole Time Equivalent (see glossary)

*An estimation of year of qualification was based on ages

The majority of GPs qualified for registration with the General Medical Council during the 1980s or 90s (65%; 109). Many GPs qualified in the decade of the 1980s (63; 38%). There was a wide spread of the length of time that respondents had practiced as a GP; ranging from 0 to 38 years with a mean of 12.1 years. 'Time practising in current locality' and 'length of time practising as a GP' was found to be the same length of time.
in 92 of the cases (50%) which could be interpreted as a rather stable work force in the study area. The range of ‘time practising in current locality’ was 0 to 32 years with a mean of 10.9 years. The usage of the expression ‘current locality’ is further discussed in the limitations section 4.4.6.

Almost three-quarters from the first sample reported one or more specialist interests or a further education (135; 73%). GPs mentioned a great range of interests, which could be divided into three categories; ‘Clinical’, ‘Organisational & Teaching’, and ‘Other’. Not surprisingly, the range of clinical interests was wider than the other two. ‘Further education’ was mentioned less frequently than ‘special interest’. This variable was not included in the repeated survey.

The repeated samples in PCT1 and PCT2 were very similar with regards to GP demographics and characteristics. The only notable difference was a higher median number of partners in PCT2 (6 compared to 4). This reflected the full population: the mean number of partners was higher in PCT2 (4.5) than in PCT1 (3.6) according to SHA records. Over half of the respondents in the repeated sample were female (59; 57%) (table 4.6). The youngest respondent was 28 years old while the oldest was 68. The mean age of the sample was 44 years. Number of years of practice as GPs varied between 3 and 33 years and the mean time of practice was 16 years. Sixty of the respondents (56%) worked in teaching practices.

The repeated sample contained a slightly higher percentage of women compared to the first sample. GPs in the repeated sample had practiced a median of 16 years; in the first sample the median length of practice was 11 years. If the samples had been identical, the difference should only be 2.5 years between the samples as that was the time span between the surveys. Therefore, it could be concluded that either the GPs in the repeated sample were slightly older or these individuals began their practice earlier compared to GPs in the first sample.

As many of the demographic and characteristic parameters were not withdrawn from the same source comparisons between the first and repeated samples could only be estimated. Approximations concluded that the samples were similar in demographics and characteristics.
4.3.6.2 Influences on prescribing

This section presents findings from items s1-s15 in the first questionnaire only. But first, in order to give an overview of what GPs thought influenced their prescribing the mean rank order of the items were calculated (table 4.7). The rank was calculated by dividing the sum of all the responses to the item (scored on Likert scale 1-5) by the number of responses to each statement. The higher the rank the greater was GPs agreement with the item.

Table 4.7 Ranking of statements s1-s15 on their influence on prescribing

<table>
<thead>
<tr>
<th>Rank</th>
<th>Mean of sums</th>
<th>Questionnaire item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.19</td>
<td>Local guidelines influence my prescribing</td>
</tr>
<tr>
<td>2</td>
<td>4.15</td>
<td>National guidelines influence my prescribing</td>
</tr>
<tr>
<td>3</td>
<td>4.07</td>
<td>Discussion with peers influence my prescribing</td>
</tr>
<tr>
<td>4</td>
<td>3.95</td>
<td>The fact that I have previously prescribed the medicine influence my prescribing</td>
</tr>
<tr>
<td>5</td>
<td>3.70</td>
<td>The fact that the patient has previously been prescribed the medicine influence my prescribing</td>
</tr>
<tr>
<td>6</td>
<td>3.66</td>
<td>Visits by Pharmaceutical Advisors influence my prescribing</td>
</tr>
<tr>
<td>7</td>
<td>3.42</td>
<td>Prescription charges influence my prescribing</td>
</tr>
<tr>
<td>8</td>
<td>3.37</td>
<td>Patient expectations influence my prescribing</td>
</tr>
<tr>
<td>9</td>
<td>3.18</td>
<td>Length of time for consultation influence my prescribing</td>
</tr>
<tr>
<td>10</td>
<td>3.13</td>
<td>Timing of consultation influence my prescribing</td>
</tr>
<tr>
<td>11</td>
<td>2.42</td>
<td>Internet information influence my prescribing</td>
</tr>
<tr>
<td>12</td>
<td>2.15</td>
<td>Advertising in journals and magazines influence my prescribing</td>
</tr>
<tr>
<td>13</td>
<td>1.90</td>
<td>Visits from drug representatives influence my prescribing</td>
</tr>
</tbody>
</table>

N.B. Items s5 and s12 were excluded as those items only appeared on the questionnaire in PCT1

Time and timing issues

The respondents were dichotomously split on the item “Length of time for consultation influences my prescribing”, 33% (61) disagreed with the statement and 51% (93) agreed. There was a similar split on the item “Timing of consultation (e.g. Friday evening, Monday morning) influences my prescribing”; 31% (57) disagreed and 48% (89) agreed. Thus, a majority of the respondents thought that aspects of time influence their prescribing.

Patients

A majority of GPs agreed with the item ‘Patient expectations influence my prescribing (Do you feel that patients expect you writing them a prescription?)’ (62%; 113), but almost a quarter disagreed (24%; 43). The fact that the patient had previously been prescribed the particular medicine also influenced GPs; a large proportion of prescribers agreed (78%; 144).
Investigating perceptions of prescribing: Results

Specialists and previous experience
Specialists had great influence on GPs’ prescribing; 91% (95) of the GPs said so and only four responders disagreed. Nearly as influential as specialists’ recommendations were prescribers’ own experience of the drug; whether they had prescribed it previously (86%; 158 agreed).

Commercial entities
Commercial sources such as drug representatives, certain Internet information and advertisements provided little influence according to the respondents. Visits by drug representatives were not seen as an influence by 72% (130) of the sample but 26% (48) of the respondents said they received visits from drug representatives on a regular basis ‘at least every third month’. The majority (121; 65%) received visits less often than yearly and of these, 27% (49) wrote on the questionnaire that they ‘never’ invited drug representatives. A greater proportion of GPs in PCT1 had frequent visits by drug representatives. Over half the sample disagreed that Internet information was influential; 55% (100), 30% (54) replied ‘neither nor’ and 16% (29) agreed. Prescribers tended to disagree that advertisements influenced their prescribing; only 9% (17) agreed, 26% (47) were uncertain and 65% (119) said that advertisements had no influence on their prescribing.

Formularies, guidelines and published literature
Local and national guidelines were influential to most prescribers; respectively 90% (167) and 91% (168) agreed to the statements and only 3 and 1 respondents respectively disagreed. Articles in journals were influential as reported by 88% (91) of the sample. This item was asked in the PCT1 sample only. GPs may report influence from published literature changes due to this may fail to appear; the former Editor in Chief of the British Medical Journal said that journal articles seldom leads to change (Smith, 2004). There is evidence that published evidence from clinical trials have an influence on prescribing patterns, but varyingly so (Technology Evaluation Center, 2004).

Pharmaceutical advisors
Almost two thirds of the sample agreed that visits by pharmaceutical advisors (PAs) influenced their prescribing (66%; 120). Occasionally, comments were left that they had had no visits by PAs. A quarter of respondents neither agreed nor disagreed that PAs
influenced their prescribing (25%; 46); a response that would merit further investigations. Sixty-eight percent (115) of the respondents received visits by PAs at least once yearly whereas one third of the sample received visits less than yearly (55; 32%). The PCTs aimed to visit all practices at least once yearly which, seemingly, was not achieved.

Monetary issues
A majority of respondents agreed that prescription charges influenced their prescribing (63%; 116) whereas 22% (41) thought the opposite. As is true for all the questionnaire items, it was not possible to say anything about how prescribing was influenced e.g. whether more or less prescriptions were issued. Such detail would need further investigations.

4.3.6.3 Attitudes towards local formularies and guidelines
Questionnaire items f1-f11 explored attitudes towards the local formularies/guidelines; PCT1 had a ‘formulary’ and PCT2 had a ‘guideline’. The two terms are used interchangeably, as the purpose was not to compare formularies and guidelines per se.

Over half of the sample said that the local formulary was user-friendly (98; 59%). One third neither disagreed nor agreed (55; 33%) and less than a tenth of the people said it was not user-friendly (13; 8%). This result repeated itself on item f7 where respondents said that the local formulary was ‘practical to use’ (99; 59%) and nine per cent (14) said it was impractical. A further explanation from those responding ‘neither nor’ would be of interest (53; 32%); did they use the formulary at all and were there issues that were more and less practical? Overall, the results suggested that there was still room for improvement of the format of the local formularies. Suggestions for improvement were discussed in the interviews (chapter 6).

The ‘user-friendliness’ of the Internet version of the local guideline was only assessed in PCT2 where the guideline was available on-line. A majority neither disagreed nor agreed (35; 58%) that the Internet version was user-friendly and one-third agreed (21; 35%). As the paper and Internet formats looked exactly the same, it could be concluded that that most respondents still preferred the paper copy version. Only a minority however, said it was not user-friendly (4; 7%). Respondents were also asked if they felt
that the electronic version was more user-friendly than the paper version and one third thought so (19; 30%). 15 prescribers (24%) felt the opposite and almost half the sample from PCT2 ‘neither disagreed nor agreed’ (29; 46%). Therefore, the electronic version was not held to be more user-friendly than the paper version. There seemed to be a smaller group of GPs that actually preferred the Internet version which is why it would be beneficial to provide both formats.

Sixty-eight percent (112) said they complied with the formulary, leaving 25% (41) responding ‘neither nor’. It would be interesting to investigate what GPs who selected the middle option meant by their response; did they comply with parts of the formulary, were they unaware of what advice was given in the formulary so that they could not say whether they complied or not, or were there other reasons for their neutral response? Only 8% (13) said they did not comply with the local formulary. Nearly half of the respondents felt that the local formulary demanded them to change their prescribing practice (68; 42%); were these GPs therefore prescribing differently to the formulary advice at the time of implementation? A large group ‘neither disagree nor agreed’ (65; 40%), whereas 18% (29) said the local formulary did not require them to change their prescribing practice. Again, further investigation to what kind of changes the formulary demanded would be merited.

Almost everyone who responded to the questionnaire agreed ‘in general’ with the formulary advice (142; 94%); only 6% (9) disagreed. It should be remembered that there was 34 (18%) missing values on this item. If the missing responders all disagreed there would only be 77% agreement with the formulary (142/185). Few GPs had been involved in the development of the formulary 15% (25). A majority (131; 78%) thought the local formulary was necessary for effective prescribing while almost as many (112; 69%) thought it was necessary for good prescribing. No respondent queried what ‘good prescribing’ comprised and thus it can be regarded as a concept with which GPs were familiar.

Just over half (87; 53%) of the prescribers looked in the formulary at least monthly, while 47% (77) used it less than monthly (figure 4.4). Considering that GPs on average issue about 1,000 prescriptions in a month (National Prescribing Centre and The NHS
Executive, 1998) one would expect that there would be at least one situation each month when the formulary was consulted.

A proportion of respondents said they needed more knowledge to use the formulary to the full (68; 41%). Twenty-eight percent (47) were uncertain and 31% (52) said they did not need any more knowledge. Interviews set out to investigate what additional knowledge was sought.

### 4.3.7 Inferential analysis

Statistics supporting the below discussion are displayed in table 4.8.

GPs that received yearly visits by drug representatives felt that they were influenced by them to a greater extent than respondents that had a lower level of contact. Those who had at least yearly contact with drug representatives perceived less influence from visits from PAs. Respondents that received yearly visits from PAs felt that they were influenced by them to a greater extent than did respondents who had less than yearly contact. There was no significant correlation between frequency of visits from PAs and drug representatives and therefore, at least, the two messengers did not compete for GPs’ time. There was no significant correlation between frequency of looking in the formulary and the frequency of visits by drug representatives. The relationship was
investigated to see whether GPs that were seeing drug representatives were ignoring the local formulary.

Prescribers who said they complied with the formulary also regarded the formulary user-friendly. Furthermore, those who said it was user-friendly did not request any additional knowledge in order to be able to use the formulary/guideline to the full. GPs who said they complied were also less likely to need any more knowledge. There was a statistically significant correlation between ‘I tend to comply with the recommendations in the local formulary’ and ‘Using the local formulary is impractical’. The results were evidence for the importance of the lay-out and implementation of the formulary.

There was a significant association between respondents agreeing with that local formularies were necessary for cost effective prescribing and the feeling that local formularies were necessary for good prescribing. This could be interpreted as those who appreciated the formulary thought that it is necessary for both cost effective and ‘good’ prescribing. This could be expressed as ‘you either buy it all or nothing’, although respondents were slightly more likely to agree with the formulary’s necessity for cost effective prescribing and disagree with its necessity for good prescribing. This suggests that the formulary was viewed more important for cost effective prescribing than for good prescribing. Respondents that agreed that the formulary was necessary for ‘good’ prescribing used it more frequently (at least once monthly) than those who did not. There was a positive and significant correlation between how often pharmacists advisors visited the GP and how often the GP looked in the formulary. This meant that a GP who had frequent visits from the PA also viewed the formulary more often than a GP who hadn’t this level of contact. Perhaps the PAs promoted the local formulary so that GPs with frequent PA visits became regular users of the formulary? The message to PAs is that their visits have an impact on formulary usage and perhaps also on prescribing habits.

No statistical significant relationship was found between responses to ‘the local formulary demands that I change my existing prescribing practice’ and responses to ‘using the local formulary is impractical’ which implied that having to change existing practice was not a reason for viewing the formulary as impractical. There was no
significant relationship between agreement of the advice in the local formulary and whether the respondent was involved in the development of the local formulary.

The sample was too small to perform statistical analysis relating perceptions of user-friendliness of the Internet guideline with whether this was perceived user-friendlier than the paper version. However, the percentage that agreed that they perceived the Internet guideline user-friendly (35%; 21) was similar to the percentage of GP that said that the Internet version was more convenient to use (30%; 19). Provided that these groups contained the same individuals the results imply that those who chose to use the Internet version were also happy with its format.

Table 4.8 Associations and correlations between questionnaire items

<table>
<thead>
<tr>
<th>Associated and correlated questionnaire items</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>s9. Visits from drug representatives influence my prescribing &amp; f14. How often do drug representatives visit you?</td>
<td>Spearman's rho = 0.559, p=0.01</td>
</tr>
<tr>
<td>s8. Visits by PCT/HA Pharmaceutical Advisers influence my prescribing &amp; f14. How often do drug representatives visit you?</td>
<td>chi$^2$=4.521; df = 1; p=0.033</td>
</tr>
<tr>
<td>s8. Visits by PCT/HA Pharmaceutical Advisers influence my prescribing f13. How often do PCT/HA Pharmaceutical advisors visit you?</td>
<td>Spearman's rho = 0.256, p=0.01</td>
</tr>
<tr>
<td>f12. How often do you look in the local formulary? &amp; f13. How often do PCT/HA Pharmaceutical advisors visit you?</td>
<td>Spearman's rho = 0.246, p=0.01</td>
</tr>
<tr>
<td>f5. I tend to comply with the recommendations in the local formulary &amp; f1. I find the local formulary user-friendly</td>
<td>Spearman's rho = 0.262, p=0.01</td>
</tr>
<tr>
<td>f1. I find the local formulary user-friendly &amp; f4. I need more knowledge to use the formulary to the full</td>
<td>Spearman's rho = -0.161, p= 0.05</td>
</tr>
<tr>
<td>f4. I need more knowledge to use the formulary to the full &amp; f5. I tend to comply with the recommendations in the local formulary</td>
<td>Spearman's rho = -0.195, p= 0.05</td>
</tr>
<tr>
<td>f5. I tend to comply with the recommendations in the local formulary &amp; f7. Using the local formulary is impractical</td>
<td>Spearman's rho = 0.188, p=0.05</td>
</tr>
<tr>
<td>f10. Do you feel that local formularies are necessary for cost effective prescribing? &amp; f11. Do you feel that local formularies are necessary for good prescribing</td>
<td>chi$^2$=48.467; df = 1; p&lt;0.0001</td>
</tr>
<tr>
<td>f11. Do you feel that local formularies are necessary for good prescribing? &amp; f12. How often do you look in the local formulary?</td>
<td>chi$^2$=30.461; df = 1; p&lt;0.0001</td>
</tr>
</tbody>
</table>

4.3.7.1 Inferential analysis between perceptions and demographics

To determine whether demographics and characteristics could be used as markers for certain views, relationships were investigated between GPs' perceptions of prescribing influences and their demographics and characteristics. This also served as a pre-analysis to the cluster analysis. The results comprised GPs from the first survey only. Association and correlation statistics were used to investigate relationships and presented in tables. Descriptive words such as 'more' and 'less' were not anchored to a certain value but only used to contrast and compare groups of GPs.
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Year of qualification

The respondents were split into groups depending on what year they qualified as a GP. The divide was set to pre-1980 and 1980 or later. The objective was to investigate whether there were any differences in perceptions between those who qualified early and those who qualified late. GPs that qualified earlier were likely to be older than GPs who qualified later, but no certain inference about age could be made as there may have been mature medical students amongst the later qualified. There were significant differences between early and late qualified GPs (table 4.9). The earlier qualified GPs were more likely to be male and to work in practices without teaching status. Teaching practices tend to be larger practices thus the teaching status could be a confounder of size of practice. Earlier qualified GPs reported less influence from PA visits and had more frequent visits from drug representatives than GPs who qualified more recently. Earlier qualified GPs admitted to influence from advertisements but perceived lower influences from Internet information than the GPs that qualified more recently. While the earlier qualified GPs used the local formulary as much as the later qualified, the earlier qualified said that the local formulary required change in practice. This is not surprising. New evidence in formularies may part from their knowledgebase to a greater extent than it does for GPs with a more recent education. Unsurprisingly, previous experience of the drug was more influential for the earlier qualified GPs.

Table 4.9 Year of qualification and relationship to perceptions of prescribing

<table>
<thead>
<tr>
<th>Questionnaire item</th>
<th>Earlier qualified (1950-1979)</th>
<th>Later qualified (1980-)</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>Female</td>
<td>chi^2=12.801; df=1; p&lt;0.0001</td>
</tr>
<tr>
<td>Type of practice</td>
<td>Not teaching practice</td>
<td>Teaching practice</td>
<td>chi^2=12.245; df=1; p&lt;0.0001</td>
</tr>
<tr>
<td>s6. Experience of drug</td>
<td>Less influential</td>
<td>More influential</td>
<td>chi^2=5.570; df=1; p=0.018</td>
</tr>
<tr>
<td>s8. Influence from PA</td>
<td>Less</td>
<td>More</td>
<td>U test=2518.5; p=0.022</td>
</tr>
<tr>
<td>s10. Internet information</td>
<td>Less influential</td>
<td>More influential</td>
<td>chi^2=5.545; df=1; p=0.019</td>
</tr>
<tr>
<td>s11. Influence from advertisements</td>
<td>More influential</td>
<td>Less influential</td>
<td>chi^2=4.019; df=1; p=0.045</td>
</tr>
<tr>
<td>f6. Local formulary and change</td>
<td>Require change of practice</td>
<td>Do not require change</td>
<td>U test=1929; p=0.011</td>
</tr>
<tr>
<td>f14. Visits from drug representatives</td>
<td>More frequent</td>
<td>Less frequent</td>
<td>U test=2472; p=0.003</td>
</tr>
</tbody>
</table>

Gender

Responses from male and female GPs were contrasted to see whether there were any differences in perceptions between the genders (table 4.10). There was a significant difference between male and female perceptions of peer influence, commercial entities and formularies. Male GPs were more often qualified earlier and worked in practices
without teaching status. When comparing tables 4.10 and 4.9 it was evident that male GPs and GPs that were qualified earlier held similar perceptions.

Table 4.10 Gender and relationship to perceptions of prescribing

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>Male</th>
<th>Female</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of practice</td>
<td>Not teaching practice</td>
<td>Teaching practice</td>
<td>Chi²=10.665; df=1; p=0.01</td>
</tr>
<tr>
<td>Year of qualification</td>
<td>Earlier</td>
<td>Later</td>
<td>Chi²=12.8; df=1; p&lt;0.0001</td>
</tr>
<tr>
<td>s7. Peer influence</td>
<td>Less influence</td>
<td>More influence</td>
<td>U test=3446; p=0.037</td>
</tr>
<tr>
<td>s9. Drug representative influence</td>
<td>More influential</td>
<td>Less influential</td>
<td>U test=2923; p=0.002</td>
</tr>
<tr>
<td>s11. Influence from advertisements</td>
<td>More influential</td>
<td>Less influential</td>
<td>U test=3167; p=0.011</td>
</tr>
<tr>
<td>f9. Formulary development</td>
<td>More often involved</td>
<td>Less often involved</td>
<td>Chi²=4.997; df=1; p=0.025</td>
</tr>
<tr>
<td>f12. Use of local formularies</td>
<td>Less frequent usage</td>
<td>More frequent usage</td>
<td>Chi²=6.096; df=1; p=0.014</td>
</tr>
<tr>
<td>f14. Visits from drug representatives</td>
<td>More frequent</td>
<td>Less frequent</td>
<td>U test=2788; p=0.0001</td>
</tr>
</tbody>
</table>

Single-handed GPs

During the time for the project there was a lot of attention towards single-handed GPs within the NHS because of the concerns that single-handed GPs would not have the time and resources to implement all requirements as set out in the new GMS contract. This spurred investigation of perceptions of prescribing influence of single-handers.

There were 9% (14) single-handed GP responding to the first questionnaire and overall they were not much different in their responses compared to other GPs. For example, they were statistically just as likely to be male or female, although 9 of the 14 single-handed GPs were male. They were as likely to disclose their practice in the first questionnaire, suggesting that single-handed GPs were no more reluctant to share their opinions about prescribing influences. There was no difference in year of qualification of single-handed and non-single-handed GPs.

Single-handed GPs were not visited by PAs or drug representatives any more or less often than other GPs. Single-handed GPs disagreed to a greater extent that length of time of consultation had an influence on their prescribing (table 4.11). Timing of consultation were the same; perhaps single-handed GPs had more freedom in how they scheduled their days and therefore could plan the consultations suitably why timing of consultation was less influential on their prescribing.
Not surprisingly, discussing prescribing issues with peers had less influence on single-handed GPs' prescribing. For some, Internet information was influential, but the relationship was not significant. The only one respondent in the full sample (n=185) who was not influenced by national guidelines was a single-handed GP.

<table>
<thead>
<tr>
<th>Questionnaire item</th>
<th>Single-handed GPs</th>
<th>Not single-handed GPs</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>s1. Length of consultation</td>
<td>Less influential</td>
<td>More influential</td>
<td>U test = 639.5; p = 0.018</td>
</tr>
<tr>
<td>s2. Timing of consultation</td>
<td>Less influential</td>
<td>More influential</td>
<td>U test = 502.0; p = 0.001</td>
</tr>
<tr>
<td>s7. Peer influence</td>
<td>Less influential</td>
<td>More influential</td>
<td>U test = 743.5; p = 0.045</td>
</tr>
</tbody>
</table>

Single-handed GPs did not use the local formulary any more or less frequently than other GPs. There was a tendency towards that single-handed GPs thought the formulary demanded a change of their existing prescribing practice. Perhaps these GPs felt that even 'small' changes in practice became major tasks to implement being on their own. No single-handed responders were involved in the development of the local formulary.

**Teaching practice**

Over half the respondents worked in a teaching practice (101; 55%). These GPs were more likely to have qualified recently; after 1980 (table 4.12). There was evidence that teaching practices had more communication with the PCT; they received practice visits from PAs more often than practices that did not have teaching status and also reported greater influence from PA visits. They saw drug representatives less often and were less influenced by their visits and by commercial advertisements. Prescription charges were more influential to GPs in teaching practices than to other GPs. GPs in teaching practices regarded their own experience of the drug and patient’s experience of the drug more influential to their prescribing than other GPs did.
Table 4.12 Type of practice and the relationship to perceptions of prescribing

<table>
<thead>
<tr>
<th>Questionnaire item</th>
<th>Teaching practice</th>
<th>Not teaching practice</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of qualification</td>
<td>Later</td>
<td>Earlier</td>
<td>( \chi^2=12.245; df=1; p&lt;0.0001 )</td>
</tr>
<tr>
<td>s4. Patient had been prescribed</td>
<td>More influential</td>
<td>Less influential</td>
<td>( U\text{ test}=3517.5; p=0.012 )</td>
</tr>
<tr>
<td>s6. Previous experience</td>
<td>More influential</td>
<td>Less influential</td>
<td>( U\text{ test}=3454.0; p=0.011 )</td>
</tr>
<tr>
<td>s8. Influence from PAs</td>
<td>More influential</td>
<td>Less influential</td>
<td>( U\text{ test}=3202.0; p=0.006 )</td>
</tr>
<tr>
<td>s9. Influence from drug representatives</td>
<td>Less influential</td>
<td>More influential</td>
<td>( U\text{ test}=2408.0; p=0.0001 )</td>
</tr>
<tr>
<td>s11. Influence from advertisements</td>
<td>Less influential</td>
<td>More influential</td>
<td>( U\text{ test}=3308.0; p=0.013 )</td>
</tr>
<tr>
<td>s14. Local formulary</td>
<td>More influential</td>
<td>Less influential</td>
<td>( U\text{ test}=3443.5; p=0.012 )</td>
</tr>
<tr>
<td>s15. Consideration of prescription charges</td>
<td>More influential</td>
<td>Less influential</td>
<td>( U\text{ test}=3339.0; p=0.006 )</td>
</tr>
<tr>
<td>f6. Local formulary and change</td>
<td>Do not require change</td>
<td>Do require change</td>
<td>( U\text{ test}=2498.0; p=0.007 )</td>
</tr>
<tr>
<td>f13. Visits from PAs</td>
<td>More influential</td>
<td>Less influential</td>
<td>( U\text{ test}=2927.0; p=0.022 )</td>
</tr>
<tr>
<td>f14. Visits from drug representatives</td>
<td>Less influential</td>
<td>More influential</td>
<td>( U\text{ test}=32248.0; p=0.0001 )</td>
</tr>
</tbody>
</table>

Respondents from the teaching practices did not feel that implementing the formulary required a change of practice which may indicate a readiness in these practices to absorb new initiatives. Local guidelines were perceived more as influential on their prescribing compared with other GPs. In conclusion, GPs from teaching practices comprised a confined group in that they reported a greater influence from unbiased sources than from commercial sources.

**Anonymity**

There were no differences between practice disclosure and the frequency of visits by drug representatives. Peers and national guidelines had more influence on GPs from disclosed practices (\( U\text{ test}=3353.5; p=0.033 \) and \( U\text{ test}=3412.0; p=0.038 \) respectively) whereas there was no differences between the groups around formulary usage except for that undisclosed GPs were more likely to disagree with general advice in the local formulary (\( U\text{ test}=2409; p=0.047 \)). Respondents leaving their practice name on the questionnaire were more likely to have been involved in the development of the local formulary (\( \chi^2=3.888; df=1; p=0.049 \)). Overall, disclosed respondents’ were not much different to undisclosed GPs with the reservation that anonymity may serve as a marker for GPs who are more reluctant to share their views.
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4.3.7.2 Differences in perceptions between study PCTs

Comparisons between the two PCT samples were undertaken using a 2-Independent sample non-parametric Mann-Whitney U-test. No assumptions about the distribution of responses in the two categories were thereby made. Differences between the PCTs were mainly found on commercial entities (drug representatives and advertising) but there were also differences on issues such as PA influence and attitudes towards the local formulary/guideline. The text below discusses differences while table 4.13 provides supportive statistics on differences.

Pharmaceutical advisors and commercial influence

GPs in PCT1 indicated greater influence from PAs although these GPs did not receive visits by PAs any more often than did GPs in PCT2 (table 4.13). It was not known whether the visits from PAs in PCT1 were more effective or if GPs in this PCT just perceived greater influence from such visits. It was not known what the ‘visits’ contained but perhaps were the content and format of visits in PCT1 better thought out. There was a significant difference between responses regarding influence from drug representative visits; GPs in PCT1 received more visits from drug representatives. GPs in PCT2 tended to disagree with the statement “Advertising in journals and magazines influences my prescribing”. It should be investigated whether GPs in PCT2 were more informed of the general (bad) quality of advertisements or if PCT2 had internal policies against commercial information.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Response option*</th>
<th>PCT1 Frequency (%)</th>
<th>PCT2 Frequency (%)</th>
<th>Statistical difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>s8. Visits by PCT/HA Pharmaceutical Advisers influence my prescribing</td>
<td>Disagree</td>
<td>6 (6%)</td>
<td>10 (13%)</td>
<td>U =3334.0 p=0.021</td>
</tr>
<tr>
<td></td>
<td>Neither nor Agree</td>
<td>22 (21%)</td>
<td>24 (30%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>75 (73%)</td>
<td>45 (57%)</td>
<td></td>
</tr>
<tr>
<td>s9. Visits from drug representatives influence my prescribing</td>
<td>Disagree</td>
<td>70 (69%)</td>
<td>60 (76%)</td>
<td>U =3268.5 p=0.020</td>
</tr>
<tr>
<td></td>
<td>Neither nor Agree</td>
<td>25 (25%)</td>
<td>8 (10%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>7 (7%)</td>
<td>11 (14%)</td>
<td></td>
</tr>
<tr>
<td>s11. Advertising in journals and magazines influences my prescribing</td>
<td>Disagree</td>
<td>61 (60%)</td>
<td>58 (72%)</td>
<td>U =3479.0 p=0.055</td>
</tr>
<tr>
<td></td>
<td>Neither nor Agree</td>
<td>29 (28%)</td>
<td>18 (22%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>12 (12%)</td>
<td>5 (6%)</td>
<td></td>
</tr>
<tr>
<td>f1. The local formulary is user-friendly</td>
<td>Disagree</td>
<td>3 (3%)</td>
<td>10 (15%)</td>
<td>U =2102.5 p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Neither nor Agree</td>
<td>26 (26%)</td>
<td>29 (44%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>71 (71%)</td>
<td>27 (41%)</td>
<td></td>
</tr>
<tr>
<td>f4. I need more knowledge to use the formulary to the full</td>
<td>Disagree</td>
<td>39 (39%)</td>
<td>13 (19%)</td>
<td>U =2239.5 p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Neither nor Agree</td>
<td>32 (32%)</td>
<td>15 (22%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>29 (29%)</td>
<td>39 (58%)</td>
<td></td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Q12. How often do you look in the local formulary?</th>
<th>Daily (%)</th>
<th>Weekly (%)</th>
<th>Monthly (%)</th>
<th>Less than monthly (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7 (2%)</td>
<td>41 (42%)</td>
<td>13 (13%)</td>
<td>37 (38%)</td>
</tr>
<tr>
<td></td>
<td>1 (2%)</td>
<td>14 (21%)</td>
<td>11 (17%)</td>
<td>40 (61%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>U = 2300.0</td>
<td></td>
<td></td>
<td>p = 0.001</td>
</tr>
</tbody>
</table>

*Agree and strongly agree has been merged to 'agree' and disagree and strongly disagree to 'disagree'.

Local formulary

GPs in PCT1 perceived their local formulary to be more user-friendly than did GPs in PCT2 (table 4.13). It should be remembered that the local formulary/guideline had been implemented for a different length of time in PCT1 and PCT2. At the time of the survey the guideline only had two chapters finalised. This may be the explanation to why GPs in PCT2 particularly, felt that they needed more knowledge of how to use the guideline. GPs in PCT2 used their guideline less often than GPs in PCT1 used their formulary. Again, as the guideline was newly introduced in PCT2 these GPs may not yet have established usage of the local guideline. Another reason could be the inherent difference between a formulary and a guideline; potentially a guideline could be remembered more easily and thus there was less need to look it up for reference.

4.3.8 Semi-structured questions

Respondents were encouraged to write down additional comments on the dichotomous items 8, 9, 10 and 11. The open questions were included as an opportunity for GPs to expand on the dichotomous questions. The response rates to these items were low; between 6% and 19%, which support the validity of contents of the questionnaire as GPs had little to add in regard to the content of the items. A weak interest in the questionnaire or time pressures may however have explained the low response rate. The findings are summarised in table 4.14 and were not considered generalisable to the whole sample but served as a source for ideas when constructing the interview schedule presented in chapter 6.
Table 4.14 Response rates and themes provide by GPs on open questionnaire items

<table>
<thead>
<tr>
<th>Item</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>sl6* Other issues that influences my prescribing, please mention</td>
<td>15%* (16)</td>
</tr>
</tbody>
</table>

Additional issues that could influence prescribing were labelled as three themes: effectiveness, patients and information. 'Effectiveness' issues related to appropriateness and cost effectiveness of the drug. 'Patient' issues related to age and ethnicity. Various educational meetings, evidence based literature and the local prescribing incentive scheme was listed under 'information'. The prescribing incentive scheme and alternative medicine were also perceived as influential on GPs’ prescribing.

f8. In general, do you agree with the advice in the local formulary? 18% (34)

Responses were mainly related to the usefulness and its prescribing advice; comments were both positive and negative. 17 of the 34 missing responders to the dichotomous item f8 still gave a written explanation and said they had never seen it or used it and preferred alternatives instead e.g. BNF. Receiving qualitative answers made a follow-up investigation of missing values redundant.

f9. Were you involved in the development of the local formulary? 6% (11)

There were only a few comments overall and they all related to what situation feedback was given but gave no detail on what specific clinical matters. Feedback from GPs had been forwarded in seminars, through the Clinical Effectiveness Group, by completing feedback forms, and through involvement in review of formulary chapters.

f10. Do you feel that local formularies are necessary for cost effective prescribing? 16% (30)

Comments emphasised the dichotomous answer already given. Those who said that local formularies were necessary for cost effective prescribing felt that this was the main purpose of the formulary. The formulary was criticised that it was not based on patient interests. Respondents thought that the BNF was sufficient as a formulary.

f11. Do you feel that local formularies are necessary for good prescribing? 19% (35)

Respondents explained that the local formularies were helpful and facilitating rather than necessary for 'good' prescribing. The formulary was held to control costs, rather than quality, by some GPs. GPs said that 'good' prescribing was also dependent on factors such as the motivation and knowledge of the GP.

*s16 was only asked in the PCT1 sample. The response was 15% looking at the PCT1 sample and 9% when regarding the total sample

4.3.9 Cluster analysis

4.3.9.1 Cluster statistics

First survey

The hierarchical cluster analysis using complete linkage (furthest neighbour) guided the decision of three clusters in the K-means cluster model. A dendrogram was generated which provided opportunity for visual investigation of cluster divides.

The six selected questionnaire items contributed significantly to the distinction of the clusters as shown by F-values (table 4.15). Frequency of visits from drug representative and frequency of usage of the local formulary were the two most important items in separating the clusters. The F-values for the six items ranged from 6.7 to 353.7. The separation of the clusters was optimised after 11 iterations (re-calculation) arranging the 148 GPs into clusters of 44, 51 and 53 GPs. Other than the iteration parameter programme default values were used in the K-means analysis. The formed clusters were called 1, 2 and 3 in the first survey and 1.1, 2.1 and 3.1 in the repeated study. The clusters in the repeated survey were named so after they were compared to the first
Investigating perceptions of prescribing: Results

clusters and it was found that cluster 1.1 resembled cluster 1 in perceptions, demographics and characteristics and cluster 2.1 resembled cluster 2 and so on.

Table 4.15 ANOVA table for cluster analysis values

<table>
<thead>
<tr>
<th>Questionnaire items</th>
<th>Cluster</th>
<th>Error</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean square</td>
<td>df</td>
<td>Mean</td>
<td>square</td>
<td>df</td>
</tr>
<tr>
<td>s7. Discussing prescribing issues with peers influences my prescribing</td>
<td>12.9</td>
<td>2</td>
<td>0.82</td>
<td>145</td>
<td>15.8</td>
</tr>
<tr>
<td>s8. Visits by PCT/HA Pharmaceutical Advisers influence my prescribing</td>
<td>13.0</td>
<td>2</td>
<td>0.92</td>
<td>145</td>
<td>14.2</td>
</tr>
<tr>
<td>s9. Visits from drug representatives influences my prescribing</td>
<td>24.6</td>
<td>2</td>
<td>0.67</td>
<td>145</td>
<td>36.6</td>
</tr>
<tr>
<td>f12. How often do you look in the local formulary?</td>
<td>41.0</td>
<td>2</td>
<td>0.39</td>
<td>145</td>
<td>104.6</td>
</tr>
<tr>
<td>f13. How often do PCT/HA Pharmaceutical Advisers visit you?</td>
<td>6.3</td>
<td>2</td>
<td>0.94</td>
<td>145</td>
<td>6.7</td>
</tr>
<tr>
<td>f14. How often do Drug Representatives visit you?</td>
<td>61.4</td>
<td>2</td>
<td>0.17</td>
<td>145</td>
<td>353.6</td>
</tr>
</tbody>
</table>

The Euclidean distances showed well-spaced clusters suggesting a succinct difference in perceptions between GPs forming cluster 1, 2 and 3 respectively (table 4.16). Clusters 1 and 3 showed the largest Euclidean distance, meaning that GPs in each of these clusters were most different in their response to the cluster items. GPs in clusters 2 and 3, that had the smallest Euclidean distance, were closest related in their perceptions.

Table 4.16 Euclidean distances between clusters in first survey

<table>
<thead>
<tr>
<th>Cluster</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>2.646</td>
<td>2.912</td>
</tr>
<tr>
<td>2</td>
<td>2.656</td>
<td>1</td>
<td>2.064</td>
</tr>
<tr>
<td>3</td>
<td>2.912</td>
<td>2.064</td>
<td>1</td>
</tr>
</tbody>
</table>

Repeated survey

The presented cluster solution was achieved after 11 calculations and the 105 GPs split into the three clusters of 56, 21 and 28 GPs. Potential reasons why groups were uneven and what possibly could have changed since the first survey is discussed in section 4.4. A similar range of F-values as the first cluster solution was generated in the repeated survey (1.0 to 318.0) (table 4.17) and all but the item ‘How often do PCT/HA Pharmaceutical Advisers visit you?’ contributed significantly to the presented solution. Like in the first cluster solution, frequency of drug representative visits was the most important item for cluster separation. The second most important item was now ‘Visits by PCT/HA Pharmaceutical Advisers influence my prescribing’ and the item q4
Investigating perceptions of prescribing: Results

‘Frequency of formulary usage’ contributed less in separation of the clusters. All six items were kept in the analysis in order to replicate the analysis of the first survey.

Table 4.17 ANOVA table for cluster analysis values

<table>
<thead>
<tr>
<th>Questionnaire items</th>
<th>Cluster</th>
<th>Error</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean square</td>
<td>df</td>
<td>Mean square</td>
<td>df</td>
</tr>
<tr>
<td>q1. Discussing prescribing issues with peers influences my prescribing</td>
<td>12.189</td>
<td>2</td>
<td>0.854</td>
<td>102</td>
</tr>
<tr>
<td>q2. Visits by PCT/HA Pharmaceutical Advisers influence my prescribing</td>
<td>41.210</td>
<td>2</td>
<td>0.232</td>
<td>102</td>
</tr>
<tr>
<td>q3. Visits from drug representatives influences my prescribing</td>
<td>23.658</td>
<td>2</td>
<td>0.538</td>
<td>102</td>
</tr>
<tr>
<td>q4. How often do you look in the local formulary?</td>
<td>5.857</td>
<td>2</td>
<td>0.939</td>
<td>102</td>
</tr>
<tr>
<td>q5. How often do PCT/HA Pharmaceutical Advisers visit you?</td>
<td>1.024</td>
<td>2</td>
<td>1.029</td>
<td>102</td>
</tr>
<tr>
<td>q6. How often do Drug Representatives visit you?</td>
<td>45.687</td>
<td>2</td>
<td>0.144</td>
<td>102</td>
</tr>
</tbody>
</table>

The repeated analysis generated a satisfactory cluster solution with similar Euclidean distances as the first solution (table 4.18). The greatest geometrical distance was between clusters 1.1 and 2.1 and the smallest between 2.1 and 3.1.

Table 4.18 Euclidean distances between clusters in the repeated survey

<table>
<thead>
<tr>
<th>Cluster</th>
<th>1.1</th>
<th>2.1</th>
<th>3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>3.614</td>
<td></td>
<td>3.189</td>
</tr>
<tr>
<td>3.1</td>
<td>3.189</td>
<td>2.199</td>
<td></td>
</tr>
</tbody>
</table>

4.3.9.2 Demographics and characteristics of the clustered GPs

There were no differences in the sample demographics and characteristics of the full sample (n=185) and the clustered sample (n=148) in the first survey. Neither was there a difference between the full (n=121) and the clustered samples (n=105) of the repeated survey. Evidence for this can be retrieved by comparing table 4.19 with table 4.6.

As previously explained the data on demographics and characteristics of the first and repeated samples were generated from different sources; comparison of the two samples could therefore not be done with precision. On variables that could be compared a difference was noted on gender proportions and length of time of practice. There was a slight difference in year of qualification and a moderate difference in non-clinical...
support staff. GPs in the first clustered sample had a lower rate of disclosed identity which is not surprising as this was optional in the first survey.

Table 4.19 Summary of cluster demographics and characteristics from the first and repeated questionnaires.

<table>
<thead>
<tr>
<th>Category</th>
<th>Response measure</th>
<th>First questionnaire Cluster population Frequency (%)</th>
<th>Repeated questionnaire Cluster population Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster sample</td>
<td>Percentage</td>
<td>148</td>
<td>105</td>
</tr>
<tr>
<td>PCT1:PCT2</td>
<td>Yes</td>
<td>59%:41%</td>
<td>56%:44%</td>
</tr>
<tr>
<td>Disclosed identity</td>
<td>No</td>
<td>92 (62%)</td>
<td>99 (94%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>56 (38%)</td>
<td>6 (6%)</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>90 (61%)</td>
<td>39 (41%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>57 (39%)</td>
<td>56 (39%)</td>
</tr>
<tr>
<td>Size of practice (F)</td>
<td>Single-handed</td>
<td>9 (7%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Double-handed</td>
<td>21 (16%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Small practice</td>
<td>20 (16%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group practice</td>
<td>79 (61%)</td>
<td></td>
</tr>
<tr>
<td>Partners in practice (R)</td>
<td>Median</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>-</td>
<td>1-8</td>
</tr>
<tr>
<td>Teaching Practice</td>
<td>Yes</td>
<td>85 (57%)</td>
<td>49 (54%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>63 (43%)</td>
<td>42 (46%)</td>
</tr>
<tr>
<td>Number of non-clinical staff (F)/ Administrative (R)</td>
<td>Median</td>
<td>6 WTE*</td>
<td>12 WTE</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>0-20</td>
<td>4-21</td>
</tr>
<tr>
<td>Number of clinical staff</td>
<td>Median</td>
<td>2 WTE</td>
<td>3 WTE</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>0-14</td>
<td>1-8</td>
</tr>
<tr>
<td>Year of qualification (F)</td>
<td>50s, 60s, 70s</td>
<td>43 (32%)</td>
<td>17 (22%)</td>
</tr>
<tr>
<td></td>
<td>80s, 90s</td>
<td>92 (68%)</td>
<td>59 (78%)</td>
</tr>
<tr>
<td>Age (R)</td>
<td></td>
<td>-</td>
<td>44 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>27-68</td>
</tr>
<tr>
<td>Length of time practising as a GP</td>
<td>Median</td>
<td>10 years</td>
<td>16.5 years</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>1-38</td>
<td>3-33</td>
</tr>
</tbody>
</table>

* WTE = Whole Time Equivalent (see glossary)

4.3.9.3 Response to cluster items

First survey

Responses to the six cluster items are described below and the differences between clusters highlighted.

It was clear that GPs in cluster 1 were less influenced by peers than were GPs in the two other clusters. Thirty percent (13) of the GPs in cluster 1 disagreed or responded 'neither agree nor disagree' to that peer discussions influenced their prescribing (Table
4.20). All GPs in cluster 2 and all but two GPs in cluster 3 agreed with that discussions with peers influenced their prescribing.

Table 4.20 Responses in clusters to item s7. “Discussion with peers influences my prescribing”

<table>
<thead>
<tr>
<th>Response alternatives</th>
<th>Cluster 1</th>
<th></th>
<th>Cluster 2</th>
<th></th>
<th>Cluster 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>1</td>
<td>2.3%</td>
<td>3</td>
<td>6.8%</td>
<td>4</td>
<td>9.1%</td>
</tr>
<tr>
<td>Disagree</td>
<td>3</td>
<td>6.8%</td>
<td>9</td>
<td>20.5%</td>
<td>10</td>
<td>19.6%</td>
</tr>
<tr>
<td>Neither disagree nor agree</td>
<td>27</td>
<td>61.4%</td>
<td>2</td>
<td>3.8%</td>
<td>30</td>
<td>56.6%</td>
</tr>
<tr>
<td>Agree</td>
<td>4</td>
<td>9.1%</td>
<td>10</td>
<td>19.6%</td>
<td>21</td>
<td>39.6%</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100%</td>
<td>51</td>
<td>100%</td>
<td>53</td>
<td>100%</td>
</tr>
</tbody>
</table>

Eighty-nine percent (47) of the GPs in cluster 3 agreed that visits from PAs influenced their prescribing (Table 4.21). A large proportion of cluster 2 GPs answered ‘neither nor’ (21; 41%) and 23% (10) of respondents in cluster 1 disagreed with the statement. In conclusion, GPs in cluster 3 perceived PAs visits as a greater influence than other GPs. This finding was related to item on frequency of visits below.

Table 4.21 Responses in clusters to item s8. “Visits by pharmaceutical advisors influences my prescribing”

<table>
<thead>
<tr>
<th>Response alternatives</th>
<th>Cluster 1</th>
<th></th>
<th>Cluster 2</th>
<th></th>
<th>Cluster 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>3</td>
<td>6.8%</td>
<td>2</td>
<td>3.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>7</td>
<td>15.9%</td>
<td>2</td>
<td>3.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither disagree nor agree</td>
<td>8</td>
<td>18.2%</td>
<td>21</td>
<td>41.2%</td>
<td>6</td>
<td>11.3%</td>
</tr>
<tr>
<td>Agree</td>
<td>24</td>
<td>54.5%</td>
<td>23</td>
<td>45.1%</td>
<td>33</td>
<td>62.3%</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>2</td>
<td>4.5%</td>
<td>3</td>
<td>5.9%</td>
<td>14</td>
<td>26.4%</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100%</td>
<td>51</td>
<td>100%</td>
<td>53</td>
<td>100%</td>
</tr>
</tbody>
</table>

GPs in cluster 2 and 3 answered similarly in regard to perceived influence from drug representatives; 86% (44) and 87% (46) respectively disagreed that drug representatives had an influence on their prescribing (Table 4.22). Cluster 1 differentiated from the two other clusters as 33% (16) neither disagree nor agree and 27% (12) agreed that drug representatives had an influence. There was only one person in each cluster 2 and 3 that agreed that drug representatives influenced their prescribing.
Table 4.22 Responses in clusters to item s9. “Visits by drug representatives influences my prescribing.”

<table>
<thead>
<tr>
<th>Response alternatives</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>5</td>
<td>11.4%</td>
<td>35</td>
</tr>
<tr>
<td>Disagree</td>
<td>11</td>
<td>25.0%</td>
<td>9</td>
</tr>
<tr>
<td>Neither disagree nor agree</td>
<td>16</td>
<td>36.4%</td>
<td>6</td>
</tr>
<tr>
<td>Agree</td>
<td>12</td>
<td>27.3%</td>
<td>1</td>
</tr>
<tr>
<td>Strongly agree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100%</td>
<td>51</td>
</tr>
</tbody>
</table>

The greatest cluster differences on usage of the formulary was seen between cluster 2 and 3 GPs; 92% (47) of cluster 2 GPs looked in the formulary less often than monthly whereas 78% (42) of the GPs in cluster 3 looked in it weekly or more frequently (table 4.23). GPs in cluster 1 were split into two groups; 52% (23) viewed it less than monthly whereas 34% (15) looked in the local formulary on a weekly basis. Only 4 of the 148 GPs used the formulary on a daily basis.

Table 4.23 Responses in clusters to item f12. “How often do you look in the local formulary?”

<table>
<thead>
<tr>
<th>Response alternatives</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
</tr>
<tr>
<td>Less than monthly</td>
<td>23</td>
<td>52.3%</td>
<td>47</td>
</tr>
<tr>
<td>Monthly</td>
<td>6</td>
<td>13.6%</td>
<td>4</td>
</tr>
<tr>
<td>Weekly</td>
<td>15</td>
<td>34.1%</td>
<td>38</td>
</tr>
<tr>
<td>Daily</td>
<td>4</td>
<td>7.5%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100%</td>
<td>51</td>
</tr>
</tbody>
</table>

About half the GPs across all clusters reported that they saw a PA once a year (table 4.24). More than one third of GPs in cluster 1 and 2 received visits less than yearly. GPs in cluster 3 received visits most frequently; about one quarter had more than yearly visits (26%; 14). This may be the reason why cluster 3 GPs said that they were influenced by PA visits to a greater extent than did the other GPs (table 4.21). Thus, more frequent visits could generate perceptions of greater impact from PAs.
Table 4.24 Responses in clusters to item fl3. “How often do pharmaceutical advisors visit you?”

<table>
<thead>
<tr>
<th>Response alternatives</th>
<th>Cluster 1</th>
<th></th>
<th>Cluster 2</th>
<th></th>
<th>Cluster 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
</tr>
<tr>
<td>Less than yearly</td>
<td>16</td>
<td>36.4%</td>
<td>18</td>
<td>35.3%</td>
<td>8</td>
<td>15.1%</td>
</tr>
<tr>
<td>Once per year</td>
<td>23</td>
<td>52.3%</td>
<td>29</td>
<td>56.9%</td>
<td>28</td>
<td>52.8%</td>
</tr>
<tr>
<td>Less than every 3 months but more than yearly</td>
<td>3</td>
<td>6.8%</td>
<td>3</td>
<td>5.9%</td>
<td>14</td>
<td>26.4%</td>
</tr>
<tr>
<td>Once every 3 months or more often</td>
<td>2</td>
<td>4.5%</td>
<td>1</td>
<td>2.0%</td>
<td>3</td>
<td>5.7%</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100%</td>
<td>51</td>
<td>100%</td>
<td>53</td>
<td>100%</td>
</tr>
</tbody>
</table>

Most GPs in cluster 2 and 3 GPs received very few visits from drug representatives; 94% (48) and 89% (47) responded ‘less than yearly’ (table 4.25). GPs in cluster 1 on the other hand, saw drug representatives once every three months or more often (36; 82%) or at least more than yearly (10; 20%). Some GPs in cluster 2 and 3 wrote on the questionnaires that they never received visits by drug representatives. These responses were coded in the ‘less than yearly’ option. It seemed that more frequent visits generated perceptions of greater impact from drug representatives (please compare table 4.25 and 4.23).

Table 4.25 Responses in clusters to item fl4. “How often do drug representatives visit you?”

<table>
<thead>
<tr>
<th>Response alternatives</th>
<th>Cluster 1</th>
<th></th>
<th>Cluster 2</th>
<th></th>
<th>Cluster 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
</tr>
<tr>
<td>Less than yearly</td>
<td>48</td>
<td>94.1%</td>
<td>47</td>
<td>88.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Once per year</td>
<td>2</td>
<td>3.9%</td>
<td>1</td>
<td>1.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than every 3 months but more than yearly</td>
<td>8</td>
<td>18.2%</td>
<td>1</td>
<td>2.0%</td>
<td>2</td>
<td>3.8%</td>
</tr>
<tr>
<td>Once every 3 months or more often</td>
<td>36</td>
<td>81.8%</td>
<td>3</td>
<td>5.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100%</td>
<td>51</td>
<td>100%</td>
<td>53</td>
<td>100%</td>
</tr>
</tbody>
</table>

Kruskal-Wallis non-parametric test was performed in order to investigate statistical differences between the clusters on the six cluster items. The three clusters were significantly different from each other on all items, which is evidence for a robust clustering (table 4.26). Cluster 1 GPs viewed peers as less influential and the perceived influence from PAs was higher in cluster 3 than in the two other clusters. Drug representative influence was greater in cluster 1 compared to cluster 2 and 3. Pharmaceutical advisors visited GPs in cluster 3 more often while GPs in cluster 1 received visits from drug representatives more often than the GPs in the other two
clusters. In regard to usage of the formulary cluster 2 GPs used it the least and cluster 3 GPs using it most frequently.

Table 4.26 Mean scores and differences between clusters on items; first study

<table>
<thead>
<tr>
<th>Cluster items from questionnaire</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
<th>Statistics*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer influence</td>
<td>3.68</td>
<td>4.20</td>
<td>4.36</td>
<td>H=23.6; df=2; p&lt;0.001</td>
</tr>
<tr>
<td>Pharmaceutical advisor influence</td>
<td>3.34</td>
<td>3.45</td>
<td>4.15</td>
<td>H=25.3; df=2; p&lt;0.001</td>
</tr>
<tr>
<td>Drug representative influence</td>
<td>2.80</td>
<td>1.47</td>
<td>1.53</td>
<td>H=47.6; df=2; p&lt;0.001</td>
</tr>
<tr>
<td>Frequency of formulary usage</td>
<td>1.82</td>
<td>1.08</td>
<td>2.85</td>
<td>H=88.3; df=2; p&lt;0.001</td>
</tr>
<tr>
<td>Frequency of pharmaceutical advisor visits</td>
<td>1.80</td>
<td>1.75</td>
<td>2.23</td>
<td>H=13.4; df=2; p=0.001</td>
</tr>
<tr>
<td>Frequency of drug representative visits</td>
<td>3.82</td>
<td>1.08</td>
<td>1.26</td>
<td>H=119.0; df=2; p&lt;0.001</td>
</tr>
</tbody>
</table>

* Kruskal-Wallis test performed on mean z-scores

Repeated survey

Distributions of responses to the six cluster items were similar to what was found in the first survey. Graphical displays were chosen to display and confirm these findings (figures 4.5 to 4.11).

There were no significant differences between the first and repeated survey on the mean scores of the clustered respondents except for the item describing perceived influence from PA visits which had decreased in the follow-up survey (figure 4.5).
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Figure 4.5 Mean scores of responses to cluster items. First and repeated survey.

Like GPs in clusters 2 and 3, GPs in clusters 2.1 and 3.1 perceived peer influence more important for prescribing than did GPs in cluster 1 and 1.1 (figure 4.6).
GPs in cluster 3.1 thought that visits from PAs influenced their prescribing whereas GPs in cluster 2.1 mainly disagreed to this influence (figure 4.7). GPs in cluster 1.1 responded 'neither nor' or agreed. The differences from the first survey were that cluster 2.1 GPs were more disagreeing than cluster 2 GPs and both cluster 3.1 and 1.1 had moved slightly towards the disagreeing end of the scale.
Figure 4.7 Distribution of responses to “Visits by pharmaceutical advisors influence my prescribing”

GPs in cluster 1.1 were the only ones that said that they were influenced by visits from drug representatives (figure 4.8) and thus the pattern from the first survey was replicated.
There was a slight difference between usage of the local formulary in the first and repeated sample: GPs in cluster 1.1 were the least frequent users of the formulary in the repeated survey whereas GPs in cluster 2 were the least frequent users in the first survey (figure 4.9). Daily usage had increased in all clusters. The labels on the x-axis denoted: 1= Less than monthly; 2= Monthly; 3= Weekly; and 4= Daily.
Figure 4.9 Distribution of responses to item; “How often do you look in the local formulary?”

Compared to the first survey respondents recorded more visits from PAs, especially the proportion of more than yearly visits had increased (figure 4.10). GPs in cluster 3.1, which was also true for cluster 3, received visits from PAs more frequently than GPs in the other clusters. The labels on the x-axis denoted: 1= Less than yearly; 2= Once per year; 3= Less than every 3 months but more than yearly; and 4= Once every 3 months or more often.
The frequency of visits from drugs representatives were distributed amongst the clusters in an almost identical way as in the first survey (figure 4.11). Cluster 1.1 received frequent visits whereas clusters 2.1 and 3.1 received near to no visits. The labels on the x-axis denoted: 1= Less than yearly; 2= Once per year; 3= Less than every 3 months but more than yearly; and 4= Once every 3 months or more often.
The mean scores of each item in for the clusters are displayed in table 4.27. A Kruskal-Wallis test confirmed that responses to the items were significantly different in the clusters with the exception for the item “Frequency of pharmaceutical advisor visits”.

Linking this finding with the fact that clusters were significantly different in their response to the item “Pharmaceutical advisor influence” meant that there was no relationship between the amount of visits and the extent to which GPs perceived influence from these visits. In other words, it seemed like frequency of visits made no difference to how much influence was attributed from the visits.

Table 4.27 Mean scores of cluster items in the cluster analysis; repeated study

<table>
<thead>
<tr>
<th>Cluster items from questionnaire</th>
<th>Cluster 1.1</th>
<th>Cluster 2.1</th>
<th>Cluster 3.1</th>
<th>Statistics*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer influence</td>
<td>3.52</td>
<td>4.14</td>
<td>4.46</td>
<td>H=19.9; df=2; p&lt;0.001</td>
</tr>
<tr>
<td>Pharmaceutical advisor influence</td>
<td>3.33</td>
<td>1.36</td>
<td>4.02</td>
<td>H=73.0; df=2; p&lt;0.001</td>
</tr>
<tr>
<td>Drug representative influence</td>
<td>3.19</td>
<td>1.11</td>
<td>1.59</td>
<td>H=46.5; df=2; p&lt;0.001</td>
</tr>
<tr>
<td>Frequency of formulary usage</td>
<td>1.67</td>
<td>2.68</td>
<td>2.46</td>
<td>H=11.8; df=2; p=0.003</td>
</tr>
<tr>
<td>Frequency of pharmaceutical advisor visits</td>
<td>1.95</td>
<td>2.14</td>
<td>2.29</td>
<td>H=2.4; df=2; p=0.308</td>
</tr>
<tr>
<td>Frequency of drug representative visits</td>
<td>3.71</td>
<td>1.07</td>
<td>1.05</td>
<td>H=86.3; df=2; p&lt;0.001</td>
</tr>
</tbody>
</table>

* Kruskal-Wallis test performed on mean z-scores
Comparing the means scores in table 4.26 with 4.27, cluster 1 and 1.1 and 3 and 3.1 were similar on most cluster items. There were however some differences between means of cluster 2 and 2.1 on influence from PA visits and usage of the local formulary where the former score had decreased and the latter increased.

4.3.9.4 Cluster demographics and characteristics

First survey

Table 4.28 summarises demographics and characteristics in the clusters. Cluster 3 tended to comprise GPs from PCT1 whereas cluster 2 tended to comprise GPs from PCT2 ($\chi^2 = 12.62; df = 2; p = 0.002$). Cluster 1 comprised a significantly larger proportion of male whereas cluster 3 contained a larger proportion of female GPs ($\chi^2 = 21.23; df = 2; p < 0.001$). Five of the nine single-handed GPs in the sample were allocated to cluster 1. There were more teaching practices represented in cluster 2 and 3 than in cluster 1 ($\chi^2 = 40.66; df = 2; p < 0.001$). Cluster 3 contained a higher proportion of GPs qualified during the 80s and 90s; for simplicity described as 'younger' GPs whereas cluster 1 comprised GPs qualified during the 70s or earlier; described as 'older' GPs ($\chi^2 = 14.20; df = 2; p < 0.001$). As previously stated, GPs that qualified later may still have been of older age if they graduated as mature students.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCT1</td>
<td>High representation</td>
<td>High representation</td>
<td></td>
</tr>
<tr>
<td>PCT2</td>
<td></td>
<td>High representation</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td>High representation</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single handed</td>
<td>Yes NS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work in teaching practice</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of non-clinical staff</td>
<td>Low</td>
<td>High</td>
<td>Average</td>
</tr>
<tr>
<td>Number of clinical support staff</td>
<td>Low</td>
<td>Average</td>
<td>High</td>
</tr>
<tr>
<td>Qualification year</td>
<td>Earlier</td>
<td></td>
<td>More recent</td>
</tr>
</tbody>
</table>

N.B. Relationships were significantly different between the clusters $p<0.05$ (95% confidence interval) unless marked with 'NS'= Non-significant. Words used to describe differences in table are not anchored to certain values but are only used for comparisons.

There was a tendency of a low number of non-clinical support staff in the practices where GPs in cluster 1 worked (0 to 4 WTE). GPs in cluster 3 generally had 5 to 8 WTE non-clinical support staff in their practices and cluster 2 GPs between 9 and 20 WTE ($\chi^2 = 15.09; df = 4; p = 0.005$). Cluster 1 GPs had a low number of clinical staff (0 to 2 WTE) (GP colleagues excluded) whereas GPs in cluster 2 more often had 3 to 5 WTE clinical staff. Cluster 3 GPs had the highest number of clinical support staff (6 and 14
There was an even dispersion of the number of identified GPs in the clusters, which meant that there was no relationship between response to cluster items and disclosure of identity.

Repeated survey

Table 4.29 summarises demographics and characteristics in the clusters. In contrast to the clusters from the first survey cluster members were evenly distributed between the two PCTs. As cluster 1 in the first survey, cluster 1.1 contained more male GPs (Chi² = 7.404, df = 2, p = 0.025). There was no difference in size of practice between the clusters but there was in teaching status; no cluster 1.1 GPs worked in teaching practices (Chi² = 24.54; df = 2; p < 0.001) whereas 65% (33) and 70% (16) of the practices in clusters 2.1 and 3.1 were teaching practices. There was a tendency that GPs in cluster 3.1 had a larger number of administrative support staff than GPs in cluster 1.1. The number of clinical staff also tended to be larger in cluster 3.1 than cluster 1.1. GPs who had been qualified for 24 years (which was as long a GP had been qualified if qualified in 1980) or longer were for the most part allocated in cluster 1.1 comprising 38% (6) of the sample. There were also some GPs in cluster 3.1 that had qualified 24 years ago or earlier (23%; 9). All GPs in cluster 2.1 had been qualified for a shorter period.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Cluster 1.1</th>
<th>Cluster 2.1</th>
<th>Cluster 3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCT1</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>PCT2</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Male</td>
<td>High rep.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single handed</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Work in teaching practice</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of administrative staff</td>
<td>Low NS</td>
<td>High NS</td>
<td>High NS</td>
</tr>
<tr>
<td>Number of clinical support staff</td>
<td>Low NS</td>
<td>High NS</td>
<td>High NS</td>
</tr>
<tr>
<td>Qualification year</td>
<td>Before 1980</td>
<td>More recent</td>
<td>A mix of before and after 1980</td>
</tr>
</tbody>
</table>

N.B. Relationships were significantly different between the clusters p<0.05 (95% confidence interval) unless marked with 'NS'= Non-significant. Words used to describe differences in table are not anchored to certain values but are only used in the sense of comparison.

There was a tendency for GPs born outside the UK to be located in cluster 1.1 (12/23) (table 4.30) and their nationalities were either African or Asian. The same trend was seen when investigating medical qualification; 13 GPs that had a foreign medical qualification were located in cluster 1.1 whereas only 1 and 3 were located in cluster 2.1 and 3.1 respectively. Due to the small numbers of foreign doctors no statistical
Inferences could be made whether these doctors were more prevalent in a specific cluster. The observation seemed to suggest that there were higher proportion of non-native English speakers in cluster 1.1 than in the other clusters. An increasingly high percentage of people from ethnic minorities are being trained as doctors in the UK; in 2005 an estimated 30% of medical graduates will have ethnic background. Twenty-five percent of the consultants in NHS hospitals have foreign background ("Professor bemoans lack of white doctors," The Independent 3 September 2004, p18.) Having a foreign education may have implications for prescribing in that different countries have different therapeutic traditions. Prescribing information and advice may also be different; for example not every country has positions with roles such as PAs' and legislation around commercial advertising is different in countries.

Table 4.30 Country of birth and medical qualification other than the UK. Repeated survey

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Cluster 1.1</th>
<th>Cluster 2.1</th>
<th>Cluster 3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country of birth other than the UK (cases)</td>
<td>Egypt (2) India (6) Kenya (1) Nigeria (2) Pakistan (1)</td>
<td>Australia (1) Canada (1) Irish Republic (1)</td>
<td>Irish Republic (1) Kenya (1) New Zealand (1) South Africa (1) Sri Lanka (1)</td>
</tr>
<tr>
<td>Country of qualification other than the UK (cases)</td>
<td>Bangladesh (1) Egypt (1) India (8) Nigeria (3)</td>
<td>Australia (1)</td>
<td>India (1) South Africa (1) Sri Lanka (1)</td>
</tr>
</tbody>
</table>

4.3.10 Interviews results and discussion

Commonly in presentations of qualitative studies, the results and discussions are merged, and so also in this chapter. Implications of the findings are discussed further in chapter seven. The views described in this section were those of the interviewed GPs only, but did often reflect the findings from the survey.

4.3.10.1 The interview sample

No major changes were made to the interview schedule as a result of the pilot interviews. Ten GPs participated in the interviews of which four worked in PCT1 and six in PCT2 (table 4.32). There were in total three female GPs but none of them belonged to PCT1 or was allocated in cluster 1. There was no significant difference between cluster allocation and willingness to participate in the interview; the clusters comprised three, two and four GP in clusters 1, 2 and 3 respectively. One interviewee could not be clustered due to missing values on the questionnaire and was therefore
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excluded in this analysis. The interviews were undertaken in March and April, 2004. The length of the interviews ranged from 14 to 28 minutes and all except two interviews were held in the GPs' surgeries; one was held in a hospital and the other in an NHS walk-in centre.

Table 4.32 Sample characteristics of the interviewed GPs

<table>
<thead>
<tr>
<th>Interview ID</th>
<th>Gender</th>
<th>PCT</th>
<th>Cluster 1.1</th>
<th>Cluster 2.1</th>
<th>Cluster 3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>F</td>
<td>2</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>F</td>
<td>2</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>27</td>
<td>M</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>M</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>50</td>
<td>F</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>62</td>
<td>M</td>
<td>2</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>64</td>
<td>M</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>M</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>66</td>
<td>M</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>74</td>
<td>M</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

4.3.10.2 Different prescribing by GPs

In addition to the four themes on which the cluster allocation was built, the GPs were also asked whether they thought that different GPs may prescribe differently for the same patient case (being the same patient, presenting at the same point of time and having the same condition) and if so, why. This section discusses the key issues to why different prescribing occurred: the GP background, education and previous experience of the drug, patients and drug representatives. GPs also mentioned that there were variations in how doctors diagnosed patients and relied on drug treatment.

All interviewees said that GPs may prescribe differently for the same patient case. Reasons mentioned by GPs in all clusters included individual preference, familiarity with a certain drug and the experience of the presenting patient. GPs agreed that doctors are a mixed group of people and that this is reflected in the variations of prescribing.

"Because everybody is different, every patient is different, every doctor is"

(GP27;C1.1;PCT1:M)

"I think we are influenced by a whole range of things, so our experience, where we come from, how we were educated... we are a mixed bunch"

(GP50;C2.1;PCT2;F)

GPs in cluster 2.1 attached much influence to GPs knowledge, present environment and their background;
"To an extent your personal characteristics influence how you choose... I think is probably to do with, you know, how well you keep up with the literature, how well you discuss with your partners, how well you see your autonomous independent individual making in decisions; there is a whole host of different reasons"

(GP22;C2.1;PCT2;F)

In contrary to GPs in other clusters, GPs in cluster 1.1 did not mention the background and previous education as reasons for different prescribing practice. This is especially noteworthy when two of the three GPs in this cluster came from overseas and also completed their first medical degree abroad (India and Nigeria). One GP in cluster 3.1 described how the practice of EBM could stem from their education:

"When and where they trained is relevant and the ways they kept up to date since they trained err... their awareness of evidence based practice is probably important err... and the extent to which they attempt to apply the principle of evidence based practice to their own practice"

(GP66;C3.1;PCT1;M)

GPs in cluster 1.1 did not mention drug representatives as a reason that made GPs prescribe differently while GPs in cluster 2.1 and 3.1 did so. The paradox of this was that cluster 1.1 GPs were the only ones who regularly invited drug representatives to their practice.

"Some people would be quite happy to be influenced by drug companies"

(GP50;C2.1;PCT2;F)

"The extent to which they meet drug reps and allow themselves to be influenced by drug reps"

(GP66;C3.1;PCT1;M)

Some GPs in cluster 1.1 and 3.1 said that different proficiency in negotiating with the patient could contribute to differences in prescribing. It was highlighted that GPs may also diagnose a patient slightly differently and hence interpret need for drugs differently.

"When you see a patient your interpretation of symptoms is probably slightly different to somebody else’s interpretation of symptoms, your perception of what patient may or may not want to take may be different to another doctor’s err... you might negotiate with the patient differently"

(GP27;C1.1;PCT1;M)

"I think there are many factors associated with doctors, many factors associated with doctor patient relationships err... within the context in which the doctor prescribes"

(GP66;C3.1;PCT1;M)

GPs in cluster 3.1 mentioned some insightful reasons that GPs may perceive their professional role differently, and that concern about the drug budget varies. They also
mentioned that different stages of learning of the GP generated different outcome. One
GP said that different GPs rely on prescribing to different extent. The quotes below
represent some of the discussed reasons:

"how you handle patient expectation and how you perceive your role in terms of health education. You
know, we see health education as being quite important part of our role, so discussing with patients how
to manage minor self limiting illnesses without necessary leaving the room with prescription and I guess
other GPs might negotiate those doctor patient relationship differently and might be more willing to go
with patient expectation, rather than challenging patient expectation"
(GP66;C3.1;PCT1;M)

"I think GPs have a varied threshold for starting prescription for things, they have different favourite
drugs that they used err... they have different threshold for diagnosing things"
(GP9;C3.1;PCT2;F)

GPs in cluster 3.1 said that there would always be a difference in prescribing between
GPs no matter how much effort was spent on getting GPs in line with recommendations.

"Obviously guidelines ought to pull us closer together I mean, I am sure they do pull us closer together
but people are always going to be different"
(GP9;C3.1;PCT2;F)

Overall, GPs considered prescribing a very complex issue and there were many ways in
which it could be performed. Two GPs in cluster 1 and 2 elegantly expressed this as;

"Medicine is definitely art, it is not a science...because medicine has no set agenda with patients and
doctors and as long as prescribing is safe and with reasonable choice, and I suppose, that's all you can ask
for really"
(GP27;C1.1;PCT1;M)

"I think it also has to do with nature of medicine and general practice that although we are spies to
evidence based and scientific... there is a great deal we don't know ... so that bring all sorts of variation
in our prescribing. I mean, prescribing is a complicated business, you know, in terms of what forms
people’s decision"
(GP50;C2.1;PCT2;F)

All interviewees agreed that GPs sometimes prescribe differently and said there were
several reasons for this relating to experience, education and from where information
was retrieved. It was agreed that prescribing is a complex process; no GPs seemed to be
surprised to the question. It was concluded that GPs agreed that there was a variation in
prescribing amongst them but mentioned slightly different reasons for this e.g. cluster
1.1 GPs did not mention drug representatives and educational background. It could
therefore be proposed that all GPs would accept the existence of the clusters.
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4.3.10.3 Peer influence

GPs were asked what influence their peers had or could have on their prescribing. This section discusses key issues from the interviews regarding peer influence such as frequency and setting for peer contact, definition of 'peers', the level of influence between peers, barriers to peer influence and how peer influence could increase.

The GPs thought of the following personnel as their peers: partners within the practice; other GPs in the PCT; practice nurses and registrars. These people represented staff traditionally employed in a GP practice. Only GPs in cluster 3.1 recognised administrative staff, practice managers and pharmaceutical advisors as their peers. Perhaps this was evidence for that GPs in cluster 3.1 worked in practices with multidisciplinary working structures.

All GPs agreed that peer discussions were important when agreeing practice policy and in order to keep up-to-date, but there were variations in how much influence they ascribed to peers. GPs in cluster 1.1 did not admit to any direct influence on their prescribing from peers but said that peer contact was good for knowledge updates, to raise awareness and to get second opinions.

"they [peers] don't influence [me] but we do talk and we are usually concerned about what drug we should be using normally, which will benefit the patient"
(GP74;C1.1;PCT1;M)

"I don't think that my peers necessarily influence my prescribing but they provide a source where we can, allow us to sort of view our opinions. We can, you know, bounce idea of each other. So I don't think they directly influence my prescribing in terms of when I talk to them I prescribe drug X instead of drug Y"
(GP27;C1.1;PCT1;M)

There was a difference between clusters in frequency of peer discussions. GPs in cluster 2.1 and 3.1 thought that peer influence was hugely beneficial and that clinicians should work together. GPs in cluster 3.1 expressed the greatest frequency of contact and seemed to value peer discussions the most. These GPs had peer review incorporated into daily practice:

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"I think it is hugely valuable for clinicians to be involved in regularly discussions about clinical management with their peers... and I think it is very valuable to take place in a clinical context after a surgery... I discuss prescribing a great deal with my partners; there are 4 partners in this practice and we have a convention of meetings, to meet after every surgery, whichever doctor is on duty meet after each surgery and talk about clinical management, and as part of the discussion... we talk about prescribing"

(GP66;C3.1;PCT1;M)

GPs in cluster 1.1 did not say that peer influence was vital for clinical practice and they had less than weekly contact discussing prescribing issues.

"we have a clinical meeting once a week ... we don’t necessary always discuss prescribing issues at that meeting but frequently we do so, maybe every other week to every three weeks"

(GP27;C1.1;PCT1;M)

In smaller practices there are fewer peers around to discuss with which may explain the differences between clusters. This is however not a fully justifiable argument as there are many ways other than face-to-face to exchange information. GPs in cluster 2.1 had email discussions to exchange information,

"We discuss individually so we can do that either verbally or through email so for example you know, just recently I had an issue about how I might deal with sweats and menopause so I sent an email around asking people’s experience for that"

(GP22;C2.1;PCT2;F)

GPs in cluster 2.1 and 3.1 thought that peer discussion was a convenient way to gain new knowledge. This may have reflected a lack of time to access and appreciate information from other sources. GPs in cluster 3.1 had both informal ‘chats’ and formal meetings where peer influence was apparent. Discussions in practice meetings showed that peer influence was highly valued whereas the informal ‘chats’ was evidence for the integration and appreciation of peer discussions in cluster 2.1 and 3.1.

"I feel that it is easy to discuss with peers because they might have read some piece of research that I haven’t had access to and so, it’s kind of a short way of trying to get information that I don’t have"

(GP22;C2.1;PCT2;F)

"there’s sort of certain amount of chatting and people would say: “have you heard this or done [that]”"

(GP9;C3.1;PCT2;F)

"we decided to work in a group practice, so basically I would think that, you know, that is the reason why err... you know, I enjoy discussion with others"

(GP22;C2.1;PCT2;F)

"we talk about prescribing that is one forum err... I am also part of self-directed learning group where GPs meet one evening every 3 weeks, we are a total of 8 GPs who are all at a similar career stage and we take turn to present educational material to each other and a lot of that is concerned with prescribing, so err... yeah, so I think I have a high level of discussion with my peers"

(GP66;C3.1;PCT1;M)
Peer influence more often took place in formal settings in cluster 1.1:

“We always have clinical meetings anyway once a week and, you know, it keeps us all up to date making sure we are all working safely, making sure we are all giving best practice, really”

(PGP27;C1.1;PCT1;M)

Peer influence was regarded positively by all clusters but was perhaps incorporated into daily practice the most amongst GPs in cluster 3.1. It was known that a higher frequency of GPs in cluster 3.1 worked in teaching practices and perhaps was GPs in cluster 3.1 self-selected to a group where training (thus peer interaction) was part of the practice agenda. As GPs in cluster 3.1 tended to be more newly qualified than GPs in cluster 1.1 and 2.1 these GPs might have felt a greater need for asking and discussing with colleagues.

“They [peers] are probably the most, probably the single thing that influences my prescribing most”

(PGP66;C3.1;PCT1;M)

A GP in cluster 1.1 suggested that specialists should come to the practice and inform the GPs. Such a formalised system for communication was not suggested by GPs in the other clusters. One GP in cluster 1.1 pointed out that peer influence must not be forced and could be negative in situations of hierarchy, for example if a GP partner would dictate to a locum GP how to prescribe.

“I think if a specialist, for example, holds a meeting and I’m attending the meeting and they make me more aware of the drug that I never felt particularly confident about using, or they make me have a better understanding of a drug, - then I am probably more likely to prescribe it”

(PGP27;C1.1;PCT1;M)

“[if the owner] would say “this is what you must prescribe if you work in my surgery” then that could be negative”

(PGP64;C1.1;PCT2;M)

One GP in cluster 2.1 thought that influence between peers had to be based on evidence as opposed to mere opinion, and that this was a reason to why influence varied from different peers.

“I think some people I trust, their err… interest in evidence based decision and other people I am less certain of perhaps, so, say once I have established a relationship and I am confident in what they are doing based on evidence, then I would more easily be guided by them or change my behaviour”

(PGP50;C2.1;PCT2;F)

One GP in cluster 2.1 thought the level of interaction was about right within the practice but the communication between practices was sparse. It was suggested that this had its
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roots in the secrecy of general practice. GP practices have traditionally worked as separate competing units as opposed of being part of and monitored by a larger organisation like the PCT. GPs have in the past earned their money by how many patients they have managed to attract and therefore it could be proposed that any critique might better be hidden in order to maintain a good reputation.

"I think is about right at the current moment, we do audits, we do lot of different things to check what we are actually doing, with each other...in terms of your colleagues outside your practice, I think is much more difficult to get their information; very often you don't know what other practices are doing... I think general practice is structured by a 'law of secrecy'. I just recently received information about practice profiles; I know my practice number and all the other practices are listed by number but I don't have access to what number represents what practice, so I don't know who I am comparing with"

(GP22;C2.1;PCT2;F)

GPs in cluster 3.1, who had the most frequent contact with peers, mentioned potential barriers to increased peer influence. In contrast, GPs in cluster 1.1 and 2.1 did not mention any obstacles to increased peer influence and they simply suggested that GPs in the practice should discuss more with each other. There could be at least two explanations for this finding; i) GPs in cluster 3.1 had incorporated peer influence in daily tasks and might therefore already spend a substantial amount of time with peers, ii) cluster 3.1 GP who had experienced a high level of peer influence might have had raised awareness towards potential barriers that GPs in cluster 1.1 and 2.1 were still unaware of. Although GPs in cluster 3.1 were slightly pessimistic towards the feasibility to increased peer influence, they still thought it would be beneficial to do so. Their suggestions for increase peer contact included closer contact with the PCT and PAs and organising professional development meetings with email contact as a cover if attendance in meetings was not possible.

"I don't know how they [peer contact] can be increased in my practice, because we work so closely together"

(GP9;C3.1;PCT2;F)

"I think probably, sort of mechanism that I am involved in for ongoing professional development; education err... I think, is probably about sufficient. I am not sure about that I feel I need to increase the influence from my peers..."

(GP66;C3.1;PCT1;M)

"The reality of getting everybody for meetings is so difficult ...ways of communicating those things but without actually physically having to get everybody together is quite important, so I think that good Internet link is an important way of increasing that kind of peer networking, given that we all are really pressed for time"

(GP9;C3.1;PCT2;F)
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In summary, the findings corresponded well with findings from the repeated survey; GPs in cluster 1.1 were less interested in having contact with peers whereas GPs in cluster 3.1 had multidisciplinary working arrangements and peer review implemented in daily practice. GPs in cluster 2.1 thought peer influence was a convenient and important way of exchanging new information (Table 4.33).
4.3.10.4 Pharmaceutical advisor influence
This section discusses key issues around pharmaceutical advisor (PA) influence such as PAs' role and working arrangements with the practices; GPs' contact with PAs and how that could be increased; and potential benefits from prescribing outreach.

The GPs in cluster 3.1 had the most frequent contact with PAs of all clusters and they met two to three times a year. In between those occasions email and phone were utilised as resource-saving means for contact. GPs in this cluster were the only ones contacting PAs on a regular basis and they felt that PAs were responsive in this communication.

"Again, it is the same old problem that it takes up time and because we’ve got that, as I said I do use email quite a lot that is fine. I mean, as long as they are available and email I suppose is better than phone because I don’t usually have time to phone during working hours. I don’t feel I need to see them face to face particularly”
(GP9;C3.1;PCT2;F)

GPs in cluster 1.1 had yearly visits from PAs regarding the Prescribing Incentive Scheme (PIS). One of these GPs had asked for an additional visit in order to clarify issues around their failed PIS. This practice had also received help to improve generic prescribing and had increased their rate from 45% to 70% according to the GP. GPs in cluster 1.1 were positive towards meeting PAs more often; a suggestion of every three months was qualified by that continuous reminders improved prescribing.

"Once in 3 months, or I don’t know whether is possible for them, but if maybe they can come frequently and then update more, maybe we can even do much better and in that way they help us…”
(GP74;C1.1;PCT1;M)

"I think the more times people tell you to cut down on your prescribing of a drug, the more likely you are to do it. The more time the people tell you your budget is overspend, the harder you will try and address that”
(GP27;C1.1;PCT1;M)

One GP in cluster 1.1 was not ‘influenced' by PAs; this GP may have felt particularly strong about the independent prescriber status compared to GPs in other clusters. The word ‘influence’ may not have described the contact with PAs in the way it was perceived by this GP.

"I don’t think they influence but hopefully give me advice to help me make a decision”
(GP27;C1.1;PCT1;M)
One GP in cluster 1.1 preferred to contact the hospital pharmacist if they had any queries about prescribing. The PA from the PCT was seen more in terms of an administrator.

"To be honest I don’t think we tend to have that many problems about prescribing, I mean, if there’s any information we need, we would phone the pharmacy advisor in [hospital name] in the pharmacy department, err… the PCT is sort of more organisational type of stuff which tend to crop up less frequently, I think"

(GP27;C1.1;PCT1;M)

GPs in cluster 2.1 did not admit to any influence from PAs, as they had not personally met PAs. Hence, the interviewed GPs in cluster 2.1 belonged to the smaller proportion of GPs in cluster 2.1 who had infrequent (or no) visits by PAs. One of the interviewed GPs worked part-time and thought this may be the reason for not having met the PA.

"Not for 10 years [have I seen a PA]. The last time I could remember seeing somebody was a long time ago at a previous practice... I work part-time and I am not a principal and maybe they [PAs] only contact principals"

(GP50;2.1;PCT2;F)

GPs in cluster 3.1 said that they were influenced by PAs and that they provided another perspective and expertise to peers. They thought that PAs had an important role in regulating prescribing between primary and secondary care. One GP in cluster 3.1 mentioned how the PAs had assisted in trying to streamline prescribing between secondary and primary care. The case related to patients being discharged on combination inhalers which were not recommended in the local formulary in PCT1. The PA was contacted in order to rectify this interface discrepancy. PAs also provide a forum where prescribing issues could be discussed.

"discharging all these people on combination inhalers - then I wrote to [the PA in PCT1] about it and she...took it up with the whatever prescribing committee of the [local hospital], and they agreed with me and ask the chest clinician to change his prescribing behaviour and he got very angry about it and he didn’t make any change, but at least it is a forum, at least we have a forum for rising these kind of things"

(GP66;C3.1;PCT1;M)

"[it] is a bit different talking to prescribing advisors and talking to a clinician. I think having prescribing advisors visiting we can get, maybe, a different perspective, or maybe a bit more of an overview. Maybe we could get technical questions answered that other clinicians wouldn’t know the answer to. I think...she [the PA] has a slightly different range of knowledge and expertise to us, so it is useful sharing ideas"

(GP66;C3.1;PCT1;M)
GPs in cluster 3.1 said that PAs raised awareness of prescribing habits and served as a prompt to learn about prescribing issues outside the GP's range of interest; one GP said that PAs made him focus at something that wouldn't have been done otherwise. PAs assisted not only in making changes but also to make GPs maintain their already adequate prescribing.

"I think the good thing about the PCT incentive scheme is that it gets you to look at thing that you haven't thought about yourself, so I mean, I have an interest in diabetes. They haven't done anything with diabetes but I do lot of readings around diabetes but they [PAs] bring in another subject I haven't thought about and that has been very good, because it made me look at something perhaps I wouldn't be doing otherwise."

(GP39;C3.1;PCT1;M)

Several interviewees said that the PAs were helpful and that discussions made them more aware of their prescribing. Comments were supported by findings in previously published material where GPs said that educational outreach was beneficial and that it was an effective method of getting prescribing information (Watson and Sharp, 2001).

GPs in cluster 3.1 thought it would be beneficial to have more frequent and regular visits by PAs but they were unsure if this was feasible due to time constraints. One GP said that they were already working at the maximum level of contact and that the practice needed some time to reflect on the information received and to undertake proposed prescribing changes.

"There is a time restriction - when we do want to get them to come, we make space for them, but we need that kind of time to go away and think about it and do the work. Usually, we end up with a task which is to say we have to do such and such a thing, and we need six months to do that task."

(GP39;C3.1;PCT1;M)

"[more frequent visits] could be useful and could influence our prescribing in a positive way and it could be a valuable relationship, but the other side of this; we are always incredibly pressed for time and fitting in regular meetings with another person would be a difficult thing to accommodate."

(GP66;C3.1;PCT1;M)

While GPs in cluster 1.1 were positive towards receiving feedback from PAs they pointed out that PAs must allow for variation in prescribing. PAs could alert GPs when prescribing became insufficient in any respect. GPs in cluster 1.1 did not mention anything about time constraints which their colleagues in cluster 3.1 did.
"it is positive from my experience... but it could be negative if it is tutorial. I mean, although discussion still leaves the choice of what you want to prescribe with you, but that's not always the case; the other would say "that's the directive from the PCT and we hold a drug budget that's why you must prescribe". Then that would be negative!"

(GP64;C1.1;PCT2;M)

"I think it good practice to keep up to date with your knowledge and for her [the PA] to feedback on our prescribing habit, and what they perceive us to be doing, and whether we should be doing anything differently, because, you know, everybody gets into their own habit easily and unless someone outside looks at it objectively, it's very easy to carry on doing what you've always done"

(GP27;C1.1;PCT1;M)

GPs in cluster 2.1 said that they had no knowledge of the chain of command between GPs and PAs and whether their practice prescribing lead, who influenced them, was in turn influenced by the PAs. The GPs from this cluster scored the lowest on influence from PAs on the questionnaire which was confirmed in the interviews. The reason for not seeing PAs was that they did not feel any need to seek their advice. One of the GPs worked in the same practice as the Prescribing Lead for the PCT and explained that this may be the reason for less involvement of the whole practice in prescribing issues linked to the PCT. Some practices in PCT2 preferred the PA to meet the principal prescriber instead of presenting information in a meeting where all GPs were present (personal communication, Pharmaceutical Advisor, PCT2, 13/02/02).

"No, because I don't know the chain of command. You know, I don't know the relationship between [the practice prescribing lead] and the PCT, so I wouldn't like to say... If I was in another practice didn't have someone like [the practice prescribing lead] whether pharmaceutical advisors would be around then... I don't really see them and I just haven't actually had a case where, in fact, I felt necessary to go and seek their advice"

(GP22;C2.1;PCT2;F)

One GP in cluster 2.1 thought it would be good to receive feedback and to get condensed evidence based information from PAs. PAs could be invited to practice meetings but few details were given whether this was feasible. Compared to GPs in the other clusters GPs from cluster 2.1 had little knowledge about PAs' roles and what they provided, and could provide, in terms of prescribing advice.

"I don't know how the system works at the moment, because I haven't come into contact with it, so I don't how could that happen but err... in this practice my guess is that it could happen by inviting them to our clinical meetings with other clinicians and discuss our prescribing"

(GP50;C2.1;PCT2;F)

"Condense the amount of information that GP receive into a helpful evidence based err... package -that could be very useful"

(GP50;C2.1;PCT2;F)
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"I'm not sure what information they would have, whether they have information about our prescribing habits and therefore be able to help us look at those, or whether they are just coming ... I don't know what the starting point is, what their role is"

(GP50;C2.1;PCT2;F)

In all, GPs from cluster 2.1 were somewhat reserved towards influence from PAs and thought that the benefit depended on who the PA was and what the basis for their advice was; perhaps these GPs felt threatened by being subject to cost containment and decreased freedom in their prescribing.

"depends who is advising, what the bases is, and what their reason is, I think"

(GP50;C2.1;PCT2;F)

In summary, GPs in this study perceived that PAs had a role to play in primary care although GPs in cluster 2.1 were somewhat unsure of what role. These GPs had many explanations and justifications for why they were not influenced or met PAs. In a study by Watson and Sharp (2001) it was reported that visits by outreach pharmacists were thought to be most appropriate for 'problem practices'; only one GP in cluster 1.1 expressed such views. GPs' perceptions of PAs are likely to, at least partly, be formed by PAs themselves. The interviews highlighted the importance that PAs make sure their role is clear and tailored to each practice individually. The findings from the interviews reflected those repeated survey; both in how influence from PA visits was perceived and how the frequency of visits were distributed across the clusters.
4.3.10.5 Drug representative influence

Issues around drug representative influence and contact were largely contributing to the cluster allocation. The key issues on drug representatives were frequency of contact, reason for contact, influence on prescribing, and quality of information.

GPs in cluster 1.1 had frequent visits from drug representatives and took advice from them. There was a spread of how often these GPs saw drug representatives; ranging from almost everyday to very infrequently in meetings outside the practice. These GPs emphasised that they studied the clinical data received from the drug representatives carefully before forming an opinion to prescribe the drug. They also explained that, for example they would not accept summarised data from the pharmaceutical industry. They found visits by drugs representatives contribute to current education and hence benefit the patient.

“I often insist that the drug reps who visit me actually give me the original papers because they present, you know, a summary of what the findings are, but these summaries do not include information like the drop out rate … and the most important fact is: it is that finding directly transferable to my patient population so, you know, I read the original paper sort of thing and make up my mind … and then I will make up my mind, so it can’t influence my prescribing”

(GP64;C1.1;PCT2;M)

“Almost everyday but err… they do give us a lot of information which are quite good and there are lot of meetings in turn which are organised by the drug company. They are very, quite, very good information actually, updates of latest knowledge”

(GP74;C1.1;PCT1;M)

Even if GPs in cluster 3.1 were very much against drug representatives and did not allow any visits drug representatives occasional contact took place at lunches and via practice nurses. GPs in cluster 3.1 did not believe that anyone could see drug representatives and still remain unaffected.

“I should say we basically have, we have err… what’s the word ‘theosophical view’ that we don’t want to see drug reps, but we do very, very occasionally. The practice nurse would see them for some specific thing err… so, for example, looking at different insulin pens or something where we actually need to see the actual physical thing and it’s the easiest way of doing it, but by large we never see drug reps”

(GP9;C3.1;PCT2;F)

“I am, probably, I am just like all the other doctors that do get influenced -but I try not to”

(GP62;C3.1;PCT2;M)

“I think people who maintain that err… meeting with drug reps doesn’t influence their prescribing are deluding themselves - why would drug company spend billion of dollars every year internationally on err… providing hospitality for doctors if it didn’t influence their prescribing? Of course, it influence their prescribing err… and I think it is err… I think it is kind of a disappointing thing doctors allow themselves to be expose to that”

(GP66;C3.1;PCT1;M)
"I am absolutely clear if I saw them they would influence me, so I don't see them...this person comes along and they have been absolutely charming to you, so you want to give them something back, so you put the patient on their drug"  
(GP39;C3.1;PCT1;M)

GPs from clusters 2.1 and 3.1 pointed out that many journals were full of adverts from drug companies. They felt that adverts may have influenced their prescribing unknowingly.

"I would be hard to deny [their influence] because you can't open a journal without seeing articles that have been influenced by drug companies or the GP freebee magazines which I look through, you know, they are full of adverts, so subliminally I may be influenced"  
(GP62;C3.1;PCT2;M)

"I try to screen their influence out as much as possible, so that I think it would be difficult but not impossible because obviously there are adverts advertising even on the front of BMJ, you know, it is difficult to eliminate completely, but I consciously don't read anything that is been funded by drug companies directly"  
(GP50;C2.1;PCT2;F)

GPs in cluster 1.1 who had frequent contact with drug representatives did not admit to any 'influence' from them but admitted, slightly reluctantly, that they had made a few changes to their prescribing after speaking to drug representatives. It seemed that these GP perceived the word 'influence' to carry negative attributes.

"they very rarely influence us, because most of the time if they are very helpful... I don't think that they influence me...drug companies coming and talk to me...it only helps me... it actually gives me an update of what medication are 'up there' at present, which are helping the people...I wouldn't change it for the sake of the drug company telling me, but I will definitely change it to this drug if it is better than that drug or the other drug is not working. I would try this to see whether that works, because at the end of the day what is most important is the patient's benefit"  
(GP74;C1.1;PCT1;M)

"I think probably, because I have seen drug reps promoting candesartan as Amias® several times I'm more familiar with that drug, so I suspect I might prescribe it not because it is a better drug but because I am more familiar with it"  
(GP27;C1.1;PCT1;M)

GPs in clusters 2.1 and 3.1 took a firm position against drug representatives and some of them had practice policies against seeing drug representatives. GPs in cluster 1.1 who had no formal practice policies against commercial influences thought it was a miss-out not to see drug representatives.

"My view is that if you don’t seek and get the information then you do lose something, because you don’t know, you are not aware what is available, but if you know what is available then you have the freedom of choosing whether you want to use it or not.”  
(GP64;C1.1;PCT2;M)
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"I think that allowing the drug reps coming is beneficial to us rather than not seeing them at all, but by not seeing them I don't think we will know, unless we are reading through pharmaceutical like MIMS, we don't get time to read all thing so when they are coming in and giving us a lot of information it does help. Not seeing I don't think is a good idea."

(GP74;C1.1;PCT1;M)

"I don't know whether we have it [policies] here. No, I don't see anyone but I haven't discussed it with others. I will be surprised that if any of them [peer GPs] would see drug reps, I think some of the practice nurses do"

(GP50;C2.1;PCT2;F)

"We have a practice policy that we don't see drug reps"

(GP22;C2.1;PCT2;F)

GPs in the cluster 2.1 and 3.1 said that drug representatives were sales people and their aim was to sell their products which made their information, at times, faulty, incomplete and of poor educational quality. These GPs did not allow them into their surgery and tried to limit their influence. The reasons for limiting drug industry influence were often politically or morally based.

"By definition they are sales people with a product to market so by definition their information is partial. We feel that our prescribing should be influenced by err... information that is scientifically vigorous and that's clearly not their remit. They are doing a job trying to sell a product, it is not within their remit to represent the information to us in an impartial way, so why would we see them? I don't understand why any doctor sees them. I find that a very mysterious and strange thing"

(GP66;C3.1;PCT1;M)

"For me is a political stance; I feel that drug companies are making an inordinate sum of money. Much of this money is actually err... is for private profit... I just dislike their policy of 3rd world medicine and a whole house of different things. I find it deeply insulting that I can be bought for a pen"

(GP22;C2.1;PCT2;F)

"We don't think they're, educationally, of any acceptable quality. They are just trying to sell stuff and we are not interested in making decisions on that basis, so you know, we think that there is no point. They are not a reputable source of an unbiased information"

(GP9;C3.1;PCT2;F)

In summary, all interviewed GPs had firm opinions about drug representatives; they either though they were a good source for knowledge about new drugs or they felt that their information was biased and faulty and did not want to have any contact with them. GPs in cluster 1.1 were positive towards drug representatives and had frequent contact with them whereas GPs in clusters 2.1 and 3.1 were firmly against all contact with pharmaceutical industry.

GPs in cluster 1.1 however, made a point of not being 'influenced' by drug representatives or by peers or PAs for that matter, but admitted that their prescribing had changed accordingly. These GPs said they made sure to evaluate advice before they
changed their prescribing. Such comments of linguistic character were not made by GPs in other clusters.

As of today, the PCTs have no control over where GPs receive information about drugs. Moynihan (2003) said that the rules regulating sponsored research were being reviewed by some leading academic institutions; maybe should this type of review be expanded to GPs and the pharmaceutical industry. Somerset and colleagues (2001) suggested it might be a good idea to have a third party to deliver unbiased educational information about new pharmaceutical products to GPs. Since then, the PAs have been trying to take on this role, but from the interviews in this project it seemed like they are not yet fully perceived as such.
4.3.10.6 Usage of the local formulary

The purpose of asking interviewees about the local formulary was to further investigate usage and influence on prescribing. It should be remembered that PCT1 had developed a full local formulary and that PCT2 had a local guideline which was only partly finished. As elsewhere in the thesis, the words local formulary and local guideline are used interchangeably in order to avoid writing out both terms.

There was a slight deviation in the views expressed in the interviews compared to the results in the repeated survey: GPs in cluster 2.1 scored high usage on the questionnaire whereas the interviewed GPs in cluster 2.1 said they made very little use of the local formulary. The GPs in cluster 2 in the first survey however, said they made little use of the formulary. Perhaps were the different results in the first and repeated survey due to the fact that the repeated survey did not state which local formulary the question concerned. Interviewees were therefore asked to establish what formulary they referred to when discussing the 'local formulary'. One GP in cluster 2.1 referred to another formulary than the one developed by the PCT. The interviewed GPs in cluster 2.1 had little to say about the local formulary. The interviewed GPs in cluster 2.1 could have been outliers on this particular issue which explains the lack of congruent results in the repeated survey.

Some GPs in cluster 1.1 looked in the formulary when it arrived but had not used it since. Other GPs reviewed updates only and justified their behaviour that they were aware of recommendations already. GPs in cluster 1.1 and 3.1 preferred to use the BNF or other formularies which they said gave more specific and extended information about drugs.

"I know what's in it. I know I have a fair idea of the batting order of prescribing most drugs, most things. I am very interested in pharmacology, so I feel I got a fair idea of my prescribing and what I feel happy doing err... and when I did look at the formulary it didn't really tell me very much that I wasn't doing already... if I want to look up a drug that is unusual, then I will look up the BNF rather than the formulary to get the full profile because the [PCT] formulary won't give you a profile of the drug"

(GP27;C1.1;PCT1;M)

"I don't really use it... but I am aware of the fact that I consult the BNF a lot ... I don't consult that [the local formulary] at all"

(GP66;C3.1;PCT1;M)
Although GPs in cluster 3.1 did not use the local formulary very often, most of them thought it was important to have it as a reference, or for support when giving feedback to the hospital consultants. It also served as an update of knowledge and as a general base when developing their practice guidelines. They expressed some influence from it and expressed trust in the advice. Perhaps a local formulary could exert influence on prescribing without being actively used?

“I actually look up the local guideline, not very often, but that’s because we refer to them when we write our in house protocol, so we will write our in house protocol in line with what the local guideline”
(GP9;C3.1;PCT2;F)

“When the new information comes through; when the update come through, I read through those just to make sure I know what I am talking about”
(GP39;C3.1;PCT1;M)

“I don’t really use it but it’s kind of reassuring knowing that it is there for reference”
(GP66;C3.1;PCT1;M)

“I tell you the time I do use it is when the consultants put people on something obscure, which they do quite often these days, something expensive that not something we normally prescribe, and we want to give them some feedback and we ask them why they prescribe this, then we use the local formulary to look and see what’s in it”
(GP39;C3.1;PCT1;M)

The slow update of the PCT formulary was a disadvantage according to GPs in all clusters. This critique should be absorbed by the PCTs as it may have consequences further than formulary usage. It may have an impact on how PCTs are perceived; as a source for readily updated, accurate and important information or the opposite. It was known that the prescribing teams in the PCTs had staff shortages and that there was a lot more on the ‘to-do-list’ than updating the local formulary. Nevertheless, it seemed important to keep up the already initiated initiatives in order to be perceived as a reliable and accountable source by the GPs. An organisation undergoing restructures may receive some empathy from the people it serves in the beginning but this may soon cease if improvement is lacking.

“‘I don’t. The only time I ever used it is, in fact, looking at the dyspepsia guideline, just reminding myself and I realised they were out of date...well, if I can’t get an update, I don’t know what they doing”
(GP22;C2.1;PCT2;F)

“We sometime update faster than they do, so we update our asthma COPD much more quickly than they update theirs err... so, you know, it depends we check what they saying when we are writing our own protocol so mostly I would actually use our in house protocols”
(GP9;C3.1;PCT2;F)
GPs mentioned a range of suggestions how to improve the local formulary. One participant in cluster 2.1 said that the format of the formulary was the greatest problem. This GP thought it would be useful to put the PCT formulary into the same folder as another formulary but practicalities made this difficult. The monthly PCT newsletter was thought to be a better alternative to formulary updates and should replace the formulary which had been a “waste of money”.

“I was told to keep it on my worktop. Where will I keep them? It is not actually physically possible and I also meant to keep the clinical effectiveness guideline on my worktop … I know it sounds really ridiculous, but if you find a 4 hole punch, well actually, if you go to Ryman, if you find a 4-hole hole punch - you can’t find them! So how can you punch these into the folder? What do you do? You know a nice idea but you can’t add to it so I don’t know… This was a quite substantial waste of money -nice idea but it just really didn’t work”

(GP22;C2.1;PCT2;F)

“I am not sure whether it will work better if it was a card index, you know, something sitting on your desk that you can actually transfer over, you know, it can either come in as a card index or come down to your computer … is probably, you know, the way to go: to access it from your computer”

(GP22;C2.1;PCT2;F)

One GP in cluster 1.1 discussed the purpose of the formulary and suggested that there was no point adding more drug profiles since the BNF already has that. According to this GP referral information incorporated in the local formulary could be useful.

“It depends what you want from the formulary: I guess if you what an improvement in terms of the detail, then is a bit like reinventing the wheel, because BNF is there and the BNF is very adequate, useful; a piece of reference material, so I don’t think there is any point increasing the profile of each drug, because that is already been done. I mean maybe there could be more information about, I don’t know, when to refer”

(GP27;C1.1;PCT2;M)

Another GP in cluster 1.1 said that the consultation process had not been wide enough and that there was a lack of ownership of the local formulary compared with the practice formulary. There was also a complaint about the implementation meeting which had been a failure and that the development of the guidelines in PCT2 had stagnated.

“Well, I thought that was really interesting: I went to the second talk and there were maybe five GPs in a room. You know, I think the turnout was completely disappointing and I think the folder they produced err… it hasn’t been followed up either and I don’t think it’s very user friendly although it was a good attempt”

(GP22;C2.1;PCT2;F)

“There is room for improvement, I mean, the consultation process is not wide enough in my opinion… I don’t think the process of consultation is robust enough between the drafting, the adoption, and the implementation of the local guideline”

(GP64;C1.1;PCT2;M)
GPs in cluster 3.1 had more empathy with the PCT and their efforts with the local formularies and highlighted that it was difficult to change GP prescribing as they were stuck in their old habits; as Seneca wrote in Troades "The mind is slow in unlearning what it has been long in learning". GPs thought that the formulary would improve as it was worked up. GPs in cluster 3.1 admitted to influence from it, but the influence however, did not seem to have come from physically using it.

"As far as they go they are very helpful. I mean, there's always areas that don't have a guideline, you know, you will never have a guideline for everything err... so, you know, I think there are some areas where things are a bit patchy, perhaps you could do a bit more development on them, but I know little by little things are extended out. People are developing in other areas, so over time I am sure you will get the total guideline done"

(GP9;C3.1;PCT2;F)

"Having this on my desk doesn't have a great influence on my prescribing but I am sure, I am sure, its contents is represented in more just than here; its contents is represented in, you know, prescribing indicators in local guideline and all kind of other way, so I think they do have an influence on my prescribing but just not through directly consulting the book, if that make sense"

(GP66;C3.1;PCT1;M)

GPs in cluster 3.1 were the only ones that said they had been influenced by the local formulary although GPs from cluster 1.1 also mentioned changes due to the formulary but denied to any 'influence'. Both GPs from clusters 1.1 and 3.1 thought they complied with the formulary although they did not use it very much. They explained:

"We discuss our clinical practice a lot we, we are quite confident that we all err... prescribe in a similar way in this practice. We are quite confident that we practice according to local guidelines which we keep regular review err... we know that we do well on all our prescribing indicators, so we know, we are prescribing kind of what the PCT said we are supposed to prescribe, so err... I guess, I am not sure what else I could get from opening that on a regular basis"

(GP66;C3.1;PCT1;M)

"I mean generally it is in the back of my mind... I am very familiar with what the local guideline. I do bear it in mind when I prescribe..."

(GP64;C1.1;PCT2;M)

One GP opposed the whole concept of guidelines as it contributed to stress, trying to remember what was in it and then prescribe accordingly. The GP explained;

"I don't think intellectually that the idea of guideline is a good idea. The doctor should understand the subject so that you know the, if it is hypertension or something, they should understand and know about the drugs that are available and advantages and disadvantages of each one...the guideline just gets in the way of that process by making the doctors have perpetual anxiety that not quite knowing what they're suppose to do"

(GP62;C3.1;PCT2;M)
In summary, none of the GPs used the local formulary to a great extent and reasons for this varied. A contributing factor may be that GPs were over-loaded with national and local formularies and guidelines (Hibble, 1998). GPs in cluster 2.1 were more negative towards the formulary in the interviews than could be expected from the response on the repeated questionnaire. None of the GPs were completely supportive of the PCT formulary and they all had issues with either the format or content of the formulary. GPs thought it was not updated often enough and that it did not contain full information or extended information which is why other sources were sometimes preferred. While this was the first time for the PCTs to create their local formulary, lessons included a more thorough consultation process and more implementation activities.
4.3.10.7 Summary of differences in perceptions between clusters

GPs’ perceptions of prescribing influence in the repeated survey were confirmed in the interviews. Table 4.33 summarises the most pertinent issues from the interviews with GPs in different clusters. Mean scores from the survey are provided for comparison.

<table>
<thead>
<tr>
<th>Theme and score</th>
<th>Cluster 1.1</th>
<th>Cluster 2.1</th>
<th>Cluster 3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Score peer influence</strong></td>
<td>3.52</td>
<td>4.14</td>
<td>4.46</td>
</tr>
<tr>
<td><strong>Peer influence</strong></td>
<td>Not highly important Weekly contact No direct ‘influence’ Formal contact Increased peer influence can happen through discussions Must not be paternalistic</td>
<td>Highly important Informal contact Considered a smooth way of communication Peer interaction appreciated Influenced by peers Weekly contact and email conversations in between Needs to be evidence based About right amount of peer influence</td>
<td>Daily contact Administrative staff and PAs also considered as peers Peer review incorporated Highlighted barriers to increased influence</td>
</tr>
<tr>
<td><strong>Score PA influence</strong></td>
<td>3.33</td>
<td>1.36</td>
<td>4.02</td>
</tr>
<tr>
<td><strong>PA influence</strong></td>
<td>Once per year Varying ‘influence’ Positive towards more visits Must not be pinpointing</td>
<td>No contact- no need No influence Unsure of role and value of PAs More contact welcomed</td>
<td>Regular contact 2-3 times per year Trust their opinion Gives additional perspective and awareness Highlighted barriers to increased influence</td>
</tr>
<tr>
<td><strong>Score drug representative influence</strong></td>
<td>3.19</td>
<td>1.11</td>
<td>1.59</td>
</tr>
<tr>
<td><strong>Drug representative influence</strong></td>
<td>Frequent contact Positive towards Did not admit to ‘influence’ but had changed their prescribing Useful information update Policies against drug representatives not supported</td>
<td>No contact Negative towards Difficult to screen out commercial influence Information faulty and incomplete Politically and morally against Had or supported policies against drug representatives</td>
<td></td>
</tr>
<tr>
<td><strong>Score local formulary usage</strong></td>
<td>1.69</td>
<td>2.68</td>
<td>2.46</td>
</tr>
<tr>
<td><strong>Local formulary usage</strong></td>
<td>Little usage Slow updates Certain hesitation Alternative sources preferred; BNF, indicators practice guidelines</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Investigating perceptions of prescribing: Results

<table>
<thead>
<tr>
<th>Used initially</th>
<th>No usage</th>
<th>Infrequent usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thought they complied</td>
<td>Bad format</td>
<td>Thought they complied</td>
</tr>
<tr>
<td>Lack of ownership</td>
<td></td>
<td>Certain influence</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Different prescribing by GPs</th>
<th>Yes, different GPs prescribe differently</th>
<th>Doctors are different</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Familiarity, experience and preference contributes</td>
<td>GP's patient negotiation skills</td>
</tr>
<tr>
<td></td>
<td>Prescribing is a complex issue</td>
<td>Role of GP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GP/patient negotiation skills</th>
<th>Education</th>
<th>Present environment</th>
<th>Personal background</th>
<th>GP characteristics</th>
<th>Source of influence: evidence or drug representatives</th>
<th>GP's patient negotiation skills</th>
<th>Role of GP</th>
<th>Source of influence: evidence or drug representatives?</th>
<th>Difference will always exist</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GP's patient negotiation skills</td>
<td>Role of GP</td>
<td>Source of influence: evidence or drug representatives?</td>
<td>Difference will always exist</td>
</tr>
</tbody>
</table>

It is important to point out that the GPs were not judged on a scale of ‘correct’ and ‘wrong’ views or ‘good’ or ‘bad’ behaviour as no such investigations were made. Each GP is different and have different priorities in order to provide high quality patient care. The concept of quality may be different between practitioners. The pace of change is associated with different motivation and ability but also with a range of practical factors. GPs recognised and acknowledged that GPs prescribe differently for other reasons than purely clinical. This can be used as a starting point for the PAs when implementing change and looking at individual GPs prescribing. GPs in all clusters recognised that to prescribe drugs is a complex business that relies on many factors.

In conclusion, the findings from the interviews corresponded well with the results form the repeated questionnaire and hence validated the both existence and the qualities of the clusters described throughout the chapter. Implications from the findings are discussed further in chapter seven.
4.4 DISCUSSION

Perceptions of prescribing influence were measured in place of measuring what may actually have influenced prescribing. Prescribing is an extremely complex process and to know what factors actually contribute to a GP's decision to issue a prescription thought-reading is needed. However, influences may be subliminal and therefore unknown also to the GP. If it was known exactly how the prescribing process worked an instrument could be developed to influence GPs accordingly. Till then, it was felt that perceptions were helpful to investigate how GPs think differently.

4.4.1 Demographics and characteristics

The reason for looking at type of practice as a denominator was based on the hypothesis that different cultures reside in practices and these can steer how GPs perceive influences and are influenced in prescribing. Practice size may influence the extent and type of written policies that a practice have. Teaching practices provide facilities for training of medical students, and therefore have regular inspections from medical authorities, which could potentially put a certain pressure on standards of practice and uptake of new initiatives. Findings showed that these practices used local guidelines and communicated with the PCTs. The sample size of single-handed practice was too small (14) to make any conclusions on differences. Other practice types such as dispensing practices could potentially influence prescribing. This type of practice is rare in urban areas and influence was therefore not investigated in this project, but it is known that the readiness of drugs in a dispensing practice increase prescribing (Senior et al., 2003). Disclosure of practice identity could be a sign of a culture of openness within the practice; alternatively the lack of inhibition may be a marker for interest in involvement in projects on prescribing such as this.

GPs in the repeated sample had been qualified longer than in the first sample and should rightly be so reflecting the time between the first and repeated surveys (2.5 years), provided that the GP population was the same. The mean value of qualified years was 16 compared to 11 years in the first survey and thus it was concluded that the GPs in the repeated sample were slightly more experienced doctors.
The reason for the large discrepancy in the reported numbers of 'non-clinical staff' in the first questionnaire and the 'administrative staff' numbers in the repeated questionnaire was unknown but can potentially be explained by errors associated with self-reports. The NHS has supported and encouraged increased administrative help to practices in recent years but that this would double the number of non-clinical staff in the repeated sample seemed unlikely.

Most GPs in the PCTs went to medical school at a younger age and qualified straight after, but this was not always the case; within each decade there are doctors who registered at a mature age (figure 4.12). This is why years of qualification cannot always predict age.

![Figure 4.12 GPs' ages and years of qualification in PCT1 and PCT2 (Based on data from the local SHA database, 2004)](image)

### 4.4.2 Influences on prescribing

The discussion of factors influencing GPs follows the same structure as in the Results section (4.3.6.2).

**Time and timing issues**

From the questionnaire it can not be concluded in what way 'length of time of consultation' influenced the prescribing. Literature said that being short of time tend to generate more prescriptions as issuing a prescription is the fastest way in which a doctor can get the patient 'out of the door' (Bellingham, 2001). It was not known in
what way ‘timing of consultation’ influenced prescribing but half the population agreed that it did. Nothing in the literature was found that could clarify this issue, why further exploration would be appropriate. Perhaps was ‘timing of consultation’ more important for GPs that perceived the workload as heavy. The Department of Health document ‘Reducing general practitioners paperwork’ (2001) suggests that the priorities for GPs should be to care for patients and not to undertake administrative paperwork which currently takes up ‘too’ much time. It was said that this proposal will be reflected in the new GMS contract (Department of Health, 2001).

Patients
The doctor-patient relationship is a much researched issue and the literature said that the patient is one of the strongest factors of influence on a doctor; drugs were often prescribed to maintain a good relationship with patients (Butler et al., 1998). Doctors themselves said that a good doctor-patient relationship is vital (Freeman and Sweeney, 2001). In a study by Mintzes et al. (2002) it was concluded that patient demand is a strong influence for issuing a prescription in primary care; patients that asked for a prescription were also more likely to get one. The findings from this thesis were in line with reviewed literature; well over half the doctors said that patients influenced their prescribing, but it was not known how. Literature said that patient demand could create unnecessary prescribing (Bellingham, 2001) and that patient demand was the most important factor influencing ‘inappropriate’ prescribing (Schwartz et al., 1989).

Specialists and previous experience
Specialists are sometimes used as educators for primary care but specialists also influence primary care prescribing when patient therapy is moved across the interface. Evidence suggest that GPs do not often have full information of why the patient is prescribed a certain drug in hospital and for that reason is less entitled to change the patient’s prescription. Therefore, the interface can contribute to unnecessary prescribing (Bellingham, 2001). This onus also has legal consequences; the GP becomes legally responsible for the issued prescriptions even if drugs were initially initiated in secondary care. Almost all GPs in the survey said that specialists influenced their prescribing which is why prescribing over the interface is an important issue to resolve.
Doctors' previous experience of a drug influenced their prescribing of that same drug; 86% agreed. Cantrill (2000) found that doctors sometimes prescribed drugs outside the recommendations in the BNF and that they prescribed drugs of limited clinical value, justifying and basing their decisions on clinical experience.

Also single-handed GPs said that they were influenced by peers, suggesting that there were other channels than meeting face-to-face in the practice. Both study PCTs arranged educational meetings on a regular basis which perhaps explained the response from single-handed GPs. The questionnaire item only investigated whether and not how peers influenced prescribing. Subsequent interviews explored the matter further.

Commercial drug information
A high proportion of GPs denied influence from commercial visits and it was known that many practices in the two PCTs did not allow drug representative visits in their practices. Nevertheless, literature concluded that drug representatives have an influence on GPs prescribing (Abbasi and Smith, 2003). Liberati and Magrini (2003) explained that the pharmaceutical industry is the main source of information to health professionals in the US as a majority of clinical research is funded by the industry. Moynihan (2003) warned that the line between education and promotion was becoming blurred; over half the money spent on continuing education of doctors comes from commercial sources. Literature has also shown that GPs who see drug representatives more frequently also have higher prescribing costs and that these GPs were also more likely to be single-handed practices (Watkins et al., 2003). Such evidence supports the importance for the PCT to establish itself as a credible source of independent research and drug information in efforts to decrease influence from commercial entities.

There was, surprisingly, no linear relationship between frequency of visits by drugs representatives and the perceived influence these visits had. Perhaps was the frequency of visits not as important as allowing visits in the first place; a doctor that invited drug representatives may perceive them influential no matter how frequent this contact was. It seemed from the responses that doctors had firm opinions of this matter. Extensive knowledge of the impact of drug representatives on GP prescribing is likely to exist within the pharmaceutical industry.
Investigating perceptions of prescribing: Discussion

The finding that frequency of visits from drug representatives were negatively correlated with the perceived influence from PAs suggested that either i) the GPs who had contact with drug representatives deliberately disregarded PAs as means for prescribing influence or, ii) drug representatives did their advertising much better than the PAs; catching the full attention of GPs’ and crowding out PAs.

The Internet was not found to be an established source of influence, which could be due to the fact that not all practices had Internet access at the time of the survey. As a source of information the Internet is highly variable in content and credibility; there are clinical pages that are sponsored by commercial entities as well as those reviewed by highly regarded sources. It could be further investigated whether general use of the Internet or the use of certain web-sites determined the response. This knowledge could be used by the PCTs when designing and promoting their Homepage. Prior to this, it may be wise to evaluate whether Internet information increase quality of prescribing.

Investment in promotional actives by the pharmaceutical industry is large; two thirds of what is spent on Research and Development is spent on promotional activities (Gottlieb, 2002). Gottlieb’s article also informed that pharmaceutical advertising most likely to influence doctors. Only 9% of this sample however said that they were influenced by advertisements. If GPs’ perceptions in our sample corresponded with reality, advertisements may be a rather ineffective method to influence prescribers. Not all advertisements are in billboard format; a printed name of drug on a pen or disguised in an article. It was likely that the GPs were more influenced by advertisement than they perceived. Literature suggested that advertising is often misleading and that doctors deny such influence (Smith, 2003).

Pharmaceutical advisors

Two-thirds of the respondents said that visits from pharmaceutical advisors influenced their prescribing. As was true for other issues in the survey, the extent of and situations where influence translated into impact was unknown. Such knowledge could help the planning of PCT spending; how much resource should be reserved for pharmaceutical outreach? Both PCTs aimed to visit all practices yearly but according to the questionnaire this was not fulfilled for all respondents. Practices receive points in the GMS contract that contributed to their pay if meeting with PA on a yearly basis and
agree three actions related to prescribing (National Prescribing Centre Homepage). This may spur regular contact between the parties. Detailed records of PA visits (e.g. what GPs were present, how long the meeting was, how many visits were made) and activity undertaken in practice should be kept. In this way, the PCT could self-monitor the uptake of PAs’ messages and provide evidence for best future strategies. In a Cochrane Review all investigated studies (9) showed that pharmacist interventions generated change in doctors’ prescribing (Bero et al., 2002).

It is known that prescribing monitoring and review by pharmacists are promising methods in achieving prescribing change within primary care. The magnitude of the effect and the cost-effectiveness of such have been difficult to establish however due to the low quality design and heterogeneity of studies (Tully and Seston, 2000). It should be established what frequency of visits provides greatest return on invested resources in terms of compliance with prescribing advice as suggested by PCTs. The cost-effectiveness of other methods for prescribing change should be compared to that of PAs. In the report “Realising the potential of pharmacists” pharmacists have been shown to improve sub-optimal prescribing by informing prescribers, undertaking prescribing reviews, and developing local formularies (RPSGB, 2002). It is known that some practices do not accept visits from PAs and that resource are scarce in PCTs for providing outreach visits. The former barrier can be regulated from authority level; by authorising PCTs to having access to practices in policy issues. Empirical evidence said that when budgets are strained man-power activities such as PA outreach are cancelled.

**Monetary issues**

Prescription charges did influence prescribing but how much and in what way was not investigated, for example whether GPs prescribed more P and OTC drugs to patients who were not paying for their prescriptions. Senior (2002) recommended other models for patient co-payment of drugs than the flat rate prescription item fee.

### 4.4.3 Formularies and guidelines

Almost all respondents regarded national guidelines as influential, but to what extent and on what issues could not be concluded from this survey. Published evidence said that NICE guidelines had no impact on clinical practice in the first year of their introduction (Bloor et al., 2003). The reason for this could be a lack of agreement
around the extent of guideline application in practice between ‘providers’ (PCTs, NHS, NICE) and users of the guidelines (doctors). Perhaps this is the culprit; unless guidelines are agreed between providers and users, full implementation will fail to come.

The way to promote local formulary usage seemed to be through face-to-face visits from PAs as frequency of PA visits was positively correlated with frequency of formulary use. This result confirms drug representatives’ sales and marketing methods; repeated visits may increase usage of promoted drugs. Knowing more about these issues could potentially enhance understanding of the impact of the local formulary. This would help the PCT prescribing team to tailor the formulary to GPs’ needs and potentially to increase usage of the same.

Both study PCTs incorporated doctors’ views when developing local formularies and guidelines; drafts were disseminated to GPs who were encouraged to give feedback. Nevertheless, some respondents wrote on the side of the questionnaire item that they had no knowledge of the local formulary/guideline. Perhaps did this lack of usage explain why about a third of GPs had no opinion whether the local formulary was user-friendly or not (55; 33%). Perceptions of user-friendliness were linked to demand for more knowledge around the formulary.

Nearly every GP (142; 94%) agreed with the local formulary in general, but only 68% (112) said they complied which suggested that agreement and actual usage were not always directly linked. The self-reported compliance compared well with what was reported in literature; 61% of the sample complied with the guideline in the study (Grol et al., 1998). Compliance rates of 50% have also been reported for clinical guidelines (Lawton and Parker, 2002). In order to establish doctors’ actual compliance rate to the local guidance the PCT could quiz GPs on local formulary advice and evaluate the prescribing data for each GP. If needs be, actions could thereafter be taken with non-compliant doctors. It should be remembered that utilisation of the formulary is not an end in itself; as long as prescribing is appropriate goals are fulfilled.

In the study by Grol and colleagues (1998), the non-compliant doctors referred to the guideline recommendations as weak and vague and that some recommendations were
controversial. Doctors know that they are not legally obliged to follow guidelines and as a matter of fact clinical guidelines are subordinate to expert witnesses in legal proceedings (Hurwitz, 1999). Non-compliance in this thesis may have been due to factors such as the ones mentioned in cited literature.

GPs who thought that the formulary was user-friendly also said they complied with the formulary and had no requests for more knowledge around the formulary. It should be investigated how this group of GPs was different from other GPs. Two-fifth of the sample said that complying with the formulary required change of practice. Having such views was however not related to perceptions of user-friendliness of the formulary. Literature showed that prescribing and clinical advice that required a change of practice was less likely to be followed than advice that did not require change of practice; 44% compared to 67% (Grol et al., 1998). PCT1 recognised this when developing their formulary; they tried to make advice similar to current local practice yet appropriate (personal communication, Formulary developer PCT1, 06/08/02).

In conclusion, GPs had reservations towards the formulary and its usage was not optimal. Many of the items required further exploration in order to know how to rectify problems around the formularies such as lack of usage and dissatisfaction with the format. Such was investigated in the interviews of this thesis (sections 4.3.10.6 and 6.3.8). Having more information around practicalities of usage could help in revisions for new formulary editions.

4.4.4 Qualitative comments
The findings from the qualitative items (s16 and f8-f11) provided little further information. Quotes were often a prompt or reservation to their agreement or disagreement of the statement. This was evidence for a valid questionnaire with clear questions, or indeed, for a GP sample that put little extra effort into the task of fully responding to the questionnaire. It is worth pointing out that ‘good’ prescribing was not defined on the questionnaire (f11) and that no respondent queried the term. This suggests that GPs needed no further interpretation of what ‘good’ prescribing implied. However, their definition was unknown and perhaps doctors’ definitions differed.
4.4.5 Clusters from first and repeated surveys

The repeated survey generated a K-means three cluster solution with a similar range of F-values as the first cluster solution. All items except for 'How often do PCT/HA Pharmaceutical Advisers visit you?' contributed significantly to the repeated cluster solution. As in the first cluster solution, the item on frequency of drug representative visits was the most important item for cluster separation. The F-value of 'Frequency of formulary usage' had decreased in the repeated survey and thus had lost much of its importance in separating the clusters.

Figures 4.13 and 4.14 display the mean value of cluster items in each cluster. The figures visualise how the clusters compared in the first and repeated cluster solution. Perceived influence from PA visits had decreased in cluster 2.1 (green line in figures) while at the same time no alterations in the total number of visits were recorded by GPs in any of the clusters (yellow line in figures). Hence, some of the influence from PAs had decreased in the repeated cluster solution. This is an important finding for the PCTs in order to rectify decreasing influence and shift the trend upwards again. Usage of the local formulary had increased in cluster 2.1 but such was not confirmed in subsequent interviews (section 4.3.10.6).
Investigating perceptions of prescribing: Discussion

Figure 4.13 Summary of mean values in clusters. First survey

Figure 4.14 Summary of mean values in clusters. Repeated survey
Investigating perceptions of prescribing: Discussion

The questionnaire was considered reliable as an instrument for clustering and especially so during a time of rapid change within primary care. Qualities of clusters are discussed below and differences between the first and repeated sample pointed out. The discussion of the first cluster solution includes responses to other questionnaire items than the six cluster items. Table 4.31 summarises the responses to cluster items in the first and repeated surveys to facilitate comparison between cluster solutions. The summary is based on frequency tables from respective survey. The words used in the tables are not absolute but instead relative in comparison to the other clusters.

Table 4.31 Summary of responses to cluster items in the first and repeated survey

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Cluster 1/1.1</th>
<th>Cluster 2/2.1</th>
<th>Cluster 3/3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer influence</td>
<td>Low/Low</td>
<td>High/High</td>
<td>High/High</td>
</tr>
<tr>
<td>Influence from PAs</td>
<td>Some/Some</td>
<td>Some/Low</td>
<td>High/High</td>
</tr>
<tr>
<td>Influence from drug reps</td>
<td>High/High</td>
<td>Low/Low</td>
<td>Low/Low</td>
</tr>
<tr>
<td>Frequency of looking in the local formulary</td>
<td>Bipolar distribution/Low</td>
<td>Low/High</td>
<td>High/High</td>
</tr>
<tr>
<td>Visits from PAs</td>
<td>Few/Few</td>
<td>Few/Few</td>
<td>More frequent/Most frequent</td>
</tr>
<tr>
<td>Visits from drug reps</td>
<td>Frequent/Frequent</td>
<td>Few/Few</td>
<td>Few/Few</td>
</tr>
</tbody>
</table>

Qualities of cluster 1 and 1.1

GPs in cluster 1 and 1.1 were similar in demographics and characteristics; they were more often male and had been qualified for a longer time than GPs in the other clusters. Potentially, age was a confounder of year of qualification. Consequently, it could turn out that GPs who were allocated to cluster 3 today might be found in cluster 1 in the future. The greater proportion of males in clusters 1 and 1.1 could be explained with the fact that only 25% of the medical graduates in 1974 were women (Davidson et al., 2002). Nowadays, more women than men enter medical school and over time the gender divide between the clusters may disappear.

GPs in clusters 1 and 1.1 tended to work in small practices that did not have any education or training responsibilities. They tended to have fewer support staff in the practices. This in combination may be why they reported a lower level of peer influence than GPs in other clusters. They received visits by PAs once yearly or less often and the amount of prescribing influence attributed to PAs varied amongst these GPs. Visits from drug representatives influenced their prescribing and the practices received frequent visits by drug representatives. The types of information sought by
these practices could have been affected by the smallness of their practices. Watkins and colleagues (2003) showed that GPs who see drug representatives most often tended to be those who were isolated from their colleagues or not involved in GP training. Usage of the local formulary varied from weekly to less than monthly.

These GPs seemed to be somewhat isolated in their working situation in that they had little contact with peers and the PCT and showed little advancement towards the new NHS agenda where quality of care should be raised by learning from non-commercial sources. Perhaps their long professional career contributed to the less enthusiasm towards changed imperatives such as local formularies, PAs and peer influence. The PCTs may reach these practices through adopting a marketing-like approach similar to that of the pharmaceutical industry. It was concluded that the cluster solutions had captured the same GPs, or GPs with the same perceptions, in both analyses.

Qualities of cluster 2 and 2.1
While the profile in cluster 2 was at large recognisable in cluster 2.1 it was interesting to note that the latter sample utilised the formulary more frequently and received more visits from PAs, but at the same time reported that the perceived influence from PA visits had actually decreased. Cluster 2 and 2.1 comprised a group that varyingly resembled cluster 1 and 3 but seemed to be closer related to the cluster 3 GPs when interpretations of data was made. Euclidean distances showed however that cluster 2 were closer associated with cluster 1 (2.310) than with cluster 3 (3.078). This finding could be explained by the different weighting that was associated with each of the items in the cluster calculations. Looking at Euclidean distances in the repeated sample cluster 2.1 was closer related to cluster 3.1 than to 1.1.

A significant number of GPs in cluster 2 and 2.1 worked in teaching practices and the clusters were mixed male and female. GPs in cluster 2, but not 2.1, were more often from PCT2. There was a high number of non-clinical support staff but only average number of clinical support staff (fellow GPs excluded) when comparing to the other clusters. Peers, patients and their own experience of the drug influenced these GPs in their prescribing. They did not receive any visits from drug representatives and perceived no influence from them. The local formulary was little used. This finding could be associated with the fact that only two of the chapters of the guidelines were
completed in PCT2 and as previously stated a significant proportion of GPs in cluster 2 belonged to PCT2.

Cluster 2 GPs seemed to be independent in regard to national imperatives of prescribing (e.g. local guidelines and PA outreach) and were more steered by their own experience and patient’s experience in their prescribing. Perhaps these GPs were opinion leaders and members on PCT boards and hence independent and confident in their own prescribing. Alternatively, these GPs worked in practices that were proactive in retrieving their own information on prescribing and thus felt less need of seeking external advice and support from formularies and PAs.

GPs in cluster 3 and 3.1
The characteristics and perceptions of GPs in cluster 3.1 were similar to those of GPs in cluster 3. Cluster 3 and 3.1 contained a larger proportion of female GPs and GPs in these clusters frequently qualified after 1980. Many worked in a group practice that had teaching responsibilities and a high number of clinical support staff. It was reported that larger practices have been shown to perform better on quality indicators than small practices but worse on access and continuity of care (Green, 2004). There has been a decrease in single-handed practices since the beginning of the 1980s and a restructure towards larger practice units. Size of practice has an effect on how professionals work together but little evidence had been found on what the effects were (Green, 2004).

Cluster 3 and 3.1 GPs perceived peers and PAs influential in their prescribing of drugs. PAs frequented their practice while visits from drug representatives were rare. Drug representatives had no influence on their prescribing as reported by these GPs. They used the local formulary frequently but the usage had dropped slightly in the repeated survey. GPs in cluster 3 agreed with the advice in the local formulary and reported high compliance.

GPs in cluster 3 and 3.1 reported a desirable pattern for influence from a stakeholder point of view in that non-commercial sources took precedence over commercial sources. These GPs had frequent contact with the PCT, which may have contributed to their positive view and high utility of the local formulary. As these GPs had a shorter professional career they may be more enthusiastic towards new changes and may be
more prone to ask peers and external sources for advice. Their more recent education may contribute towards their preference of non-commercial sources from commercial.

From the study results it seemed likely that a theoretical model of typing GPs in regard to their perceptions of prescribing influence is plausible. The items that were used for the cluster analysis were general in their character and there was no attachment to a specific event or certain circumstances. Even so, robust separation of GPs was possible. This is evidence for a significant difference in how GPs think around prescribing influence.

4.4.6 Limitations and difficulties

4.4.6.1 Construction of the questionnaires

The study design of the first and repeated questionnaire meant that the results were not generalisable outside the two PCTs, but described the GP samples fully. There was however no intention to make the study generalisable at this stage but instead to build a perceptual model of what influences prescribing in the sample. The questionnaire was not tested for framing effects; whether the order of the items had any effect on the answers. The order of the cluster items was kept the same in both questionnaires.

There was a possibility that the use of different letterheads on the first and repeated questionnaires (respectively the PCTs and the University) had an impact on the response of the first and repeated questionnaires. Perhaps did the GPs feel more obliged to respond to a questionnaire issued by their stakeholders than by independent researchers? While it is known that questionnaires from universities are more likely to be returned than questionnaires from commercial sources (Edwards et al., 2002) university letterheads did not receive a greater response than PCT letterheaded questionnaires in this project. For further clarifications it would be interesting to investigate the response rate to two identical surveys except for that one was advertised as 'academic research' and the other one as 'PCT audit'. Until further knowledge is acquired on this topic the same letterhead should be used in initial and repeated studies.

While the data sets from the first and repeated questionnaires corresponded it needs mentioning why different sources for GP demographics and characteristics were used:
• At the time of the first survey the SHA database was unknown to the principal researcher
• To overcome potential errors associated with self-reported data the decision was taken to make use of SHA data in the repeated survey
• In order to keep the repeated questionnaire schedule brief the researcher decided to rely on the SHA data set

It was not specified on the repeated questionnaire which local formulary/guideline that was the subject of the item. Possibly, GPs may have had another local formulary/guideline in mind when responding to the item. This potential source of error was assessed in the interviews. When the interviewees were asked which local formulary/guideline they thought of, all except one mentioned the local PCT formulary/guideline. This suggested that the item could be kept in the analysis.

4.4.6.2 The samples
Details of missing data were given in the results section as part of good research conduct. The one item (f8) with a high frequency of missing values was set on a dichotomous scale. The lesson learnt was not to force responders into categories as they seemed to rather have left it blank than to choose any of the responses.

The response rate of the repeated questionnaire (40%) was lower than expected and a non-responder bias could therefore have been introduced in the survey. If the non-response is large, a follow-up study to assess whether these subjects were any different from the responding group should be undertaken. The demographics and characteristics of the repeated sample were largely the same as in the first sample which supported the argument of non-bias and justified that follow-up was left out. This argument is only valid when the samples are drawn from the same population. As GPs in the first survey reported a workforce that was stable to the area, the population from where the samples were drawn was assumed to be the same in the two surveys. From SHA records it was estimated that 83% of the GPs were the same in both PCTs over the study period. The first questionnaire had a response of 68% which is held as a sufficient percentage to minimise non-responder bias.
4.4.6.3 The cluster analysis
Inherent to K-means cluster analysis, both the number of clusters and what items to use for the clustering is decided by the researcher. The process was guided by inferential statistics preceding the cluster analysis which indicated what items were meaningful in separating respondents (section 4.3.6 and 4.3.7). Hierarchical cluster analysis guided the number of clusters present in the sample (section 4.3.9.1). For additional confirmation of selected items, F-values of the K-means cluster analysis was utilised to determine what items contributed the greatest to the cluster solution. It is possible that the survey data contained other meaningful cluster solutions than was presented in this thesis.

GPs that did not respond to the questionnaire in full were not included in the cluster analysis as full completion of the six items was a methodological requirement. Thus, these GPs were excluded in the validation interviews and in the analysis of prescribing data. Potentially, these GPs comprised a group with common attributes. This group should be identified.

4.4.6.4 The interviews
Due to the time constraints, the selection of interviewees was based on preliminary cluster solution as questionnaires were still being collected at this time. Ideally, the interviews should have been arranged after all repeated questionnaires had been returned and the cluster of each GP was known. As a matter of fact, the final cluster solution did not alter the cluster belonging for the interview recruits. The sample of GPs was evenly dispersed over the clusters and as such the sample was satisfactory.

Due to the sampling method of self-selecting to the interviews, the sample may have been biased by GPs who like to make their voice heard, GPs who have firm opinions about issues around prescribing, and GPs who had time to participate. It is not obvious what GPs with these attributes should have in common. Despite the limited number of interviewed GPs in each cluster, the results validated the cluster dispersions.
4.5 CONCLUSIONS

The aims of the study were fulfilled in that GPs' perceptions of prescribing influences were described and demographics and characteristics related to perceptions. The questionnaire was found to be a reliable instrument for cluster analysis and the cluster solution was validated and further explained through the interviews presented in this chapter. Reliability extending further than the 2.5 years was not tested due to the limited time frame of the project.

The sample reflected influences on prescribing as has been described in literature (section 1.4 PART II). Three robust clusters of GPs were formed on the basis of their perceptions of influence on prescribing. The repeated cluster analysis gave the same results and thus it could be concluded that influences on prescribing or indeed GPs own perceptions of prescribing influences did not change over the time scale of a couple of years. The clusters were significantly different from each other in regard to peer, PA, and drug representative influence, and usage of the local formulary. The clusters were also distinct in regard to demographics and characteristics, such as gender, type of practice and year of qualification.

From the interviews it was concluded that GPs in general were positive towards prescribing influence from peers and PAs except for the interviewed GPs in cluster 1.1 who were slightly more reserved towards peers. GPs in cluster 2.1 had little experience of PAs. Most GPs thought that influence from drug representatives and commercial advertisements were negative, although GPs in cluster 1.1 thought the opposite. Perhaps PCTs should develop a strategy to decrease drug representative visits and increase their own presence in the GP practices. Changes to the local formulary were proposed and should be enacted by the PCT in order to increase utility for the GPs. At the time of the interviews, the formulary was little used by GPs in all clusters. Cluster differences in the repeated survey were for most parts confirmed in follow-up interviews. Further discussions on labelling of the GPs in the different clusters are presented in chapter seven.
The findings confirmed that prescribing is a complex issue and that different individuals have different opinions on how and what to prescribe. The PCTs need to address all issues where there is a complaint or lack of knowledge from GPs. Only then can a collaborative working relationship with the GPs be formed. It is likely that some differences between GP’s perceptions of influence will always remain but the effort, to assure safe and effective prescribing bearing in mind the cost of the drug, should not be given up.

As a matter of fact, the study results showed that GPs have different perceptions of what influences their prescribing but the study made no conclusions whether these differences would account for any differences in actual prescribing habits. If differences in perceptions could be related to different prescribing habits this could have profound implications for PCT management strategies to target different GPs with prescribing information. Therefore, and in order to increase the practical utility of these findings, prescribing profiles were matched to each cluster, and presented in chapter five.
CHAPTER 5

DESCRIBING AND EXPLAINING PRESCRIBING TRENDS
5.1 INTRODUCTION

Clustering techniques, as presented in chapter four, defined three robust clusters of GPs with regard to their perceived influences on prescribing. The relationship between GPs’ perceptions, and demographics and characteristics further distinguished the clusters. In this chapter, prescribing data was related to clusters to assess whether there was a relationship between GPs’ perceptions of prescribing influence and how they actually prescribe. This chapter also presents local prescribing activities and relates that to prescribing trends using a novel application of the ARIMA analytical technique and intervention analysis. Prescribing was explored in selected therapeutic areas through a set of experiments.

5.1.1 Aims
The study had four aims: to describe trends of prescribing in selected therapeutic areas using predefined prescribing indicators; to investigate and compare prescribing trends in different clusters and in the PCTs; to relate prescribing trends to national and local prescribing activities; and to investigate prescribing trends in different patient populations. In order to achieve the above aims, objectives were set and undertaken through separate ‘experiments’.

5.1.2 Objectives
In order to achieve the above aims the following objectives were undertaken:

i. To describe prescribing activities undertaken in the PCTs
ii. To describe performance on the Prescribing Incentive Schemes (PIS) and to compare this between the clusters

iii. To select prescribing indicators for investigation

iv. To collect prescribing data from the PACT database on the selected prescribing indicators

v. To describe and compare prescribing trends in the two PCTs

vi. To describe and compare prescribing trends in the clusters

vii. To describe prescribing in different patient populations

viii. To relate prescribing trends prescribing activities promoted nationally or by the PCTs

5.1.3 Working hypotheses

a) There is a relationship between GPs’ perceptions of prescribing, their characteristics and prescribing behaviours

b) The relationship between prescribing trends and the incentives and activities promoted by the PCTs vary between practices
5.2 METHODS

The study comprised six sub-studies that were nominal experiments. They were not experiments in the true sense as no randomisation was undertaken. The prescribing trends analysis was a quasi-experiment by definition, but for simplicity all sub-studies were called experiments and recognised under the following descriptions:

1. Comparison of local prescribing activities in the PCTs
2. Evaluation of the prescribing incentive schemes
3. Comparing prescribing trends between PCT1 and PCT2
4. Comparing prescribing trends between clusters
5. ARIMA and intervention analysis
6. Prescribing in different populations

Four types of data were used in the experiments; data on local interventions and prescribing activity initiated by the PCTs, data on how much PIS money each practice was awarded, data on national prescribing related initiatives and prescribing data from the ePACT database (table 5.1).

<table>
<thead>
<tr>
<th>Type of data</th>
<th>Utility of data</th>
<th>Used in experiment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCT activity data</td>
<td>Prescribing initiatives were compared between the PCTs and related to ePACT data for analysis of impact</td>
<td>1, 3, 4, 5, 6</td>
</tr>
<tr>
<td>Prescribing Incentive Scheme (PIS)</td>
<td>Data on practices' achievements in PISs was compared.</td>
<td>2, 3, 4, 5</td>
</tr>
<tr>
<td>NICE guidelines, technological appraisals and NSFs</td>
<td>Guidelines and technological appraisals from NICE and NSFs were assessed against prescribing trends during the time of the project</td>
<td>3, 4, 5, 6</td>
</tr>
<tr>
<td>ePACT</td>
<td>Prescribing data provided evidence of prescribing habits within PCTs and clusters, data was at times related to local PCT activity data</td>
<td>3, 4, 5, 6</td>
</tr>
</tbody>
</table>

5.2.1 Comparison of local prescribing activities in the PCTs

Information on local prescribing activities which 'could have had an impact on prescribing' was requested from the prescribing teams in both PCTs. Each half year during January 2000 to December 2003 an explanatory letter and data forms for completion were sent to the PCTs (Appendix IV). The data was recorded on a monthly basis but later collapsed into quarterly categories to match the time interval used for the ePACT data. The received official data was not checked for correctness or completeness.
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in accordance with the pragmatic conduct that permeated the thesis. A content analysis
of the reported activities was undertaken; the total number of activities was counted and
the range of activities compared between the PCTs. Density of activities in different
time periods was also described.

5.2.2 Evaluation of the prescribing incentive schemes

The contents of the PISs were compared between the PCTs for the years 2000/01 and
2001/02. The PISs were related to prescribing trends in subsequent experiments in
respective therapeutic areas.

Practices' achievements in the two schemes (2000/01 and 2001/02) were investigated in
PCT1. The PCT had set the maximum pay for achievements to £1500 per Whole Time
Equivalent (WTE) GP in both years. The sample comprised practices that took part in at
least one PIS in either of the years.

5.2.3 Experiments using prescribing data

5.2.3.1 Selecting prescribing indicators

Prescribing data from the electronic Prescribing Analysis and Cost (ePACT) was
collected for experiments 3, 4, 5 and 6. Prescribing indicators were selected upon advice
from the PCT prescribing team and the availability of prescribing indicators in the
Toolkit database (section 3.3.3). The researcher had prior to this identified therapeutic
areas from their appearance in NICE guidelines and media and consulted the prescribing
teams on their utility for investigation. The prescribing teams suggested investigating
therapeutic areas on which local prescribing interventions had been undertaken. Local
activities tended to reflect national prescribing policy and priorities e.g. to increase the
proportion of generic prescribing. Indicators were selected through consensus from the
project board. In all, a pragmatic approach was applied to the selection of prescribing
indicators. Prescribing data on the selected indicators were collected for the experiments
(table 5.2).
Table 5.2 Prescribing indicators for which data was collected

<table>
<thead>
<tr>
<th>Prescribing indicator</th>
<th>Prescribing comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage Generic Items</td>
<td>Generic Items/Items</td>
</tr>
<tr>
<td>Antibiotics*</td>
<td>Items/STAR-PU</td>
</tr>
<tr>
<td>Benzodiazepine Receptors* PU-01</td>
<td>ADQ/STAR-PU</td>
</tr>
<tr>
<td>Atypical antipsychotics* PU-01</td>
<td>Atypical Items/Items</td>
</tr>
<tr>
<td>Ulcer Healing drugs PU-9</td>
<td>ADQ/STAR-PU</td>
</tr>
<tr>
<td>Statins PU-97</td>
<td>ADQ/STAR-PU</td>
</tr>
<tr>
<td>Drugs of Limited Clinical Value PU-97</td>
<td>NIC/PU</td>
</tr>
<tr>
<td>Cox -2 Inhibitors PU-97</td>
<td>ADQ/STAR-PU</td>
</tr>
<tr>
<td>Antibacterial drugs PU-97</td>
<td>ADQ/STAR-PU</td>
</tr>
<tr>
<td>Antibacterial drugs</td>
<td>NIC/Items</td>
</tr>
<tr>
<td>Drugs affecting renin-angiotensin system PU-97</td>
<td>ADQ/STAR-PU</td>
</tr>
<tr>
<td>All Prescribing PU-97</td>
<td>NIC/ASTRO-PU</td>
</tr>
<tr>
<td>Percentage Cost New Drugs</td>
<td>Cost of new drugs/Overall prescribing</td>
</tr>
<tr>
<td>NSAIDs PU-97</td>
<td>ADQ/STAR-PU</td>
</tr>
</tbody>
</table>

*Indicator developed for assessment by Commission for Health Improvement

5.2.3.2 Prescribing indicators

The selected prescribing indicators are described below in alphabetical order.

Drugs affecting the renin-angiotensin system indicator

Angiotensin-Converting Enzyme Inhibitors (BNF section 2.5.5.1.) and Angiotensin-II Receptor Antagonists (BNF Section 2.5.5.2) were included in the indicator ‘drugs affecting the renin-angiotensin system’. National recommendations sought to increase the use of these drugs for patients with cardiac insufficiencies.

Antibiotics

The indicator ‘Item Antibiotics per STAR-Pus’ included all oral formulations presented in BNF 5.1 (i.e. tablets, capsules, liquids). As synthetic antibiotics also were included in the indicator the label Antibacterials would be more appropriate. High rates of antibiotics indicate inappropriate prescribing of antibiotics; a rate below 0.30 items/STAR-PUs should be achieved according to national targets.

Atypical antipsychotics

The atypical antipsychotics indicator constituted the substances amisulpride, clozapine, olanzapine, quetiapine, risperidone and zotepine. The newer atypical antipsychotics were more expensive than standard antipsychotics, but had a gentler side-effect profile and were as effective. NICE guidance recommended using these as first line therapy.
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Benzodiazepines
Benzodiazepines indicator included the following substances: oliazepam, oprazolam, lorazepam, lormetizepam, nitrazepam and temazepam. The newer so called z-drugs (zaleplon, zolpidem and zopiclone) were not included in this indicator. These z-drugs (also called non-benzodiazepine hypnotics) were introduced in the late 1980s and early 90s and took some of the market share of benzodiazepines. National imperatives recommended reducing the usage of benzodiazepines and shortening the treatment courses. A rate over 3.0 ADQ/STAR-PU was a cause for concern according to the PIS in PCT1 in 2002.

Cox-2 selective inhibitors
The indicator of Cox-II selective inhibitors comprised rofecoxib and celecoxib. National guidance recommended using these substances for rheumatoid arthritis patients that had a high risk of severe gastrointestinal problems if using NSAIDs.

Drugs of Limited Clinical Value
The so called Drugs of Limited Clinical Value (DLCV) were per definition drugs that had little or no lasting therapeutic effect for the majority of patients according to an evaluation by the Audit Commission (1994). Many of these items were marked with half-filled rectangles in the BNF denoting that the preparation was considered less suitable for prescribing by the Joint Formulary Committee. It was recognised that some of these preparations were appropriate to some patients but their prescribing should be relatively low (Audit Commission, 1994).

The DLCV indicator included drugs from the below BNF sections, with the exception of certain drugs within each section.

BNF code
1.4 Anti-diarrhoea
2.6.4 Peripheral/cerebral vasodilators
3.9 Cough preparations
3.10 Systemic nasal decongestants
4.5 Appetite suppressants
9.7 Bitters & tonics
10.3.2 Topical anti-rheumatics
12.2.2 Topical nasal decongestants
12.2.3 Anti-infective nasal preparations
12.2.2 Lozenges, sprays and gels
13.14 Topical circulatory preparations
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Generic prescribing
The generic prescribing indicator constituted the percentage generic prescribing of total prescribing. A generic prescribing rate of below 50% was a cause for concern according to PCT1 in 2002. The Department of Health target was 72% at the end of the project (Department of Health Homepage).

Ulcer-healing drugs
Ulcer-healing drugs included in the Toolkit indicator included drugs from the BNF sections 1.3.1 to 1.3.5. Proton Pump Inhibitors is the most expensive group of drugs used for ulcers and can take up as much as 10% of a PCT’s drugs budget (Thorburn et al., 2000).

New drugs
New drugs are defined as drugs that are labeled with an inverted black triangle in the BNF. These are drugs under ‘intensive surveillance’ for a minimum of two years by the Committee for Safety of Medicines. The purpose of the surveillance is to collect more safety data on these medicines. New drugs are heavily promoted by drug representatives to secure returns before patent rights run out and to help establish a place in the drug market. Besides lacking full safety data, new drugs are often expensive and therefore carry cost implications for the PCT.

Non-Steroidal Anti-Inflammatory Drugs
All Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) in the BNF section 10.1.1 were included in the Toolkit indicator. The usage of NSAIDs should be limited as they can cause gastrointestinal problems.

Statins
The statins included in the Toolkit were: atorvastatin, cerivastatin, fluvastatin, lovastatin sodium, pravastatin sodium and simvastatin. In April 2001, NICE guidance recommended statin therapy after a myocardial infarct without cardiac failure if serum cholesterol exceeded 4mmol/L.
5.2.3.3 Samples of prescribing trends data

There were in total 24 practices from PCT1 and these were split into clusters 1, 2, and 3 containing 9, 7 and 8 practices respectively. Clusters in PCT2 comprised 12, 8 and 2 practices in clusters 1, 2, and 3 respectively comprising in total 22 practices. The full population in PCT1 and PCT2 counted 61 and 56 practices respectively. The samples and denominators differed in the experiments.

Comparing prescribing trends between PCT1 and PCT2

All practices that were included in the Toolkit database and had prescribed medicines on at least one of the selected indicators during the period July 2000 to July 2003 were included in the study; 43 and 48 practices from PCT1 and PCT2 comprised the sample. The diversion from the full populations was due to the exclusion of some practices upon advice from the PCTs (e.g. practices with GP locums only and NHS walk-in centres). 95% confidence intervals were applied to the mean prescribing in each PCT.

Comparing prescribing trends between clusters

Only practices that could be clustered were included in the analysis. As described in figure 5.2 allocation to either cluster 1, 2 or 3 could only be undertaken if at least one GP in the practice had answered all of the six cluster items on the questionnaire. Only GPs that left the name of their practice could be matched against the prescribing data. If practitioners in the same practice were allocated to different clusters e.g. two GPs to cluster 1 and one GP to cluster 2, the practice was put into cluster 1. Hence, the statistical parameter ‘mode’ (denoting the most common value in a data set) was used in cluster allocations; if there was more than one mode within a practice, i.e. if two clusters were equally common within a practice, the practice was excluded in the sample. The decision to use mode of individual GP allocations to assign practice allocation was supported by the fact that 78% (7/9) of the practices with multiple identified responses in PCT1 and 100% (7/7) in PCT2 had GPs who were allocated to the same cluster. Therefore, the studies were performed on the hypothesis that practices are more likely to contain like-minded GPs than not.
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<table>
<thead>
<tr>
<th>GP responded to the first survey</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP responded to all six cluster items so that allocation to cluster was possible</td>
<td>No</td>
</tr>
<tr>
<td>The GP left name of practice on the survey so it was possible to match the practice to its prescribing profile</td>
<td>No</td>
</tr>
<tr>
<td>ePACT data for the practice was present in the Toolkit database</td>
<td>Excluded from analysis</td>
</tr>
</tbody>
</table>

Included in analysis

Figure 5.2 Inclusion criteria for practices in prescribing analysis experiments

ARIMA and intervention analysis
Clustered practices in PCT1 were subject to an experiment with ARIMA analytical technique and intervention analysis measuring the effect of PISs on percentage generic prescribing.

Prescribing in different populations
Two practices in PCT1 (labelled as A and B) that had the same principal prescriber were included in the study. Practice A had 4 partners and practice B was a single-handed practice. None of the practices were teaching practices. Practice B had a patient population that diverged from the population otherwise seen in the PCT. The population in this practice comprised a large proportion of middle-aged and pre-retirement men in employment.

5.2.3.4 Collection and manipulation of prescribing trend data
Prescribing data for selected indicators were collected from terminals at the PCT that had an NHS-Net connection. Prescribing data for each practice was retrieved from the Toolkit database for each quarter. This was the shortest time period that was available. The data was extracted in an Excel format and had to be modified before inserting it in
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SPSS where analysis was undertaken. The principal prescriber in each GP practice was the denominator when formatting the spreadsheets with the VLOOKUP function in Excel. Means and 95% confidence intervals for each indicator in each cluster were calculated.

5.2.3.5 Data cleaning of prescribing trend data

There were three potential sources of error affecting the final database: the first was that the ePACT database itself has an error rate of 0.3% according to information from the PPA (personal communication PPA Advisor, 18/06/02). Such errors were due to erroneous input of data by PPA staff and were out of the researchers’ control; it could not be controlled or checked.

The second potential source of error was associated with the extraction of data from the ePACT database, for example selecting the wrong indicator or the same quarter twice. This error was minimised by visually scanning the collected data during the development and manipulation of the database. The third potential source of error had to do with the formatting of the data into suitable SPSS format. In these procedures no data was typed out manually; instead whole quarters were ‘cut and pasted’ between data files. The procedures for checking the data for these errors are explained below.

Quality control was undertaken in two stages on the finalised SPSS spreadsheets. In the first stage, one practice was randomly selected using the Randomizer Internet programme\(^1\). Accuracy of data for that practice was checked in all quarters on each prescribing indicator against the original Toolkit file. As data were formatted and ‘cut & pasted’ into the final spreadsheet, there was no manual typing errors for an individual practice alone. Should an error appear the whole quarter would be erroneous. In the second stage, four indicators were randomly selected. The number of indicators was generated by taking the square root of the total number of indicators (\(\sqrt{17}=4.1\)). These indicators were checked for correctness against the extracted Toolkit files. In addition, if anything in the prescribing graphs looked unusual during the analysis, the extracted Toolkit spreadsheets were referred.

\(^1\)Numbers for quality control were generated in the randomiser programme Research Randomiser (www.randomizer.org) Copyright © 1997-2003 Geoffrey C. Urbaniak and Scott Plous. (accessed 20/01/04)
Outliers in prescribing

Practices which had no partners and were run by locum GPs were excluded as these practices may have a large turnover of doctors and prescribing therefore may vary considerably. One single-handed practice from PCT1, Identity (ID) 61, was excluded in the analysis due to the fact that it served a very distinct and special population compared to the other practices in the PCT to which it belonged. A sample representing the prescribing in that practice showed that the prescribing in this practice was out of range compared to the other practices (figures 5.3a-d). Interestingly, the same GP worked in another practice in PCT1 where the prescribing was in line with the PCT as a whole. A separate case experiment was made in these two practices (section 5.3.6).

Figure 5.3a Boxplot of practices using prescribing of ACE inhibitors as an indicator, showing outliers

Figure 5.3b Boxplot of practices using prescribing of NSAIDs as an indicator, showing outliers
5.2.3.6 **Analysis and presentation of prescribing trends**

As the PACT database contained dispensed medications only the words ‘prescribed and dispensed’ should be used when discussing this prescribing data. In spite of this, the author has consistently used the word ‘prescribed’ as the focus of this thesis is how different GPs prescribe and not which prescriptions were actually dispensed.

Sequence graphs proved useful to investigate trends in prescribing and to compare prescribing in different groups; significant differences could be identified with applied 95% confidence intervals. Volume or cost of the drug per prescribing unit was displayed along the y-axis and each quarter was marked along the x-axis. Thus, the data point for ‘Jul 01’ comprised prescriptions dispensed from the 1st of April - 30th June.
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2001. Legends in graphs denoted the PCT/Cluster/Practice of the prescribing area and the associated 95% confidence interval.

Techniques of ARIMA and intervention analysis were utilised to exemplify how the impact of local prescribing activities on prescribing could be measured. ARIMA models are related to regression models but where regression models can be built on the basis of prior research and/or theory, ARIMA models must be built empirically from the data. As there was no models available to build investigations on, the experiments more appropriately utilised ARIMA instead of regression models.

Generic prescribing was a mandatory audit in the PCT1 PISs during the investigation period. Intervention analysis, assuming no external impact and stepwise effect, was applied to a univariate ARIMA analysis.

Local and national prescribing activities were discussed in conjunction to prescribing trends in efforts to establish any effects on prescribing. No investigations were made into time frames for uptake of prescribing advice. Prescribing areas that contributed to the discussion were displayed in the thesis.
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5.3 RESULTS

5.3.1 Comparison of local prescribing activities in the PCTs

The experiment sought to establish whether there were any differences in regard to amount and type of prescribing activities reported by the two PCTs. This data was also used in the evaluation of prescribing trends.

PCT2 had recorded almost twice as many activities as PCT1 (71 compared to 40). The difference was greatest in 2000 and 2001 when PCT1 recorded only 9 activities. Activities were grouped into types and details displayed in table 5.2 are based on the data provided by the PCTs.

Both PCTs recorded activities relating to guidelines and formulary development and launch. Educational and outreach visits such as workshops and pharmaceutical outreach, details about the PISs, and when a member of the prescribing team left a post or the post was filled were also kept. Activity around antibiotics and drugs for gastrointestinal conditions were mentioned more often than any other therapeutic areas. The reason for these foci could be that PCT2 was producing the gastrointestinal chapter for their local guideline at the time of data collection and that both PCTs felt their PPI costs were high (personal communication, Pharmaceutical Advisors in PCT1 and PCT2 11/12/01). Both PCTs also reported that they aimed to decrease inappropriate prescribing of antibiotics in line with a Department of Health initiative launched in 1998 to reduce prescribing of antibiotics (House of Lords, 1998).

It was found that the greater number of activities reported in PCT2 was partly due to double-recording of an activity and that interventions were sometimes reported in sub-parts, e.g. activity around a guideline on angina pectoris was split into several parts: i) first meeting, ii) merging guideline with other guideline, iii) finalising guideline and iv) guideline sent out for consultation. Considering this, content analysis concluded that types and amount of prescribing activities were comparable in the two PCTs (table 5.3).
### Describing and explaining prescribing trends: Results

<table>
<thead>
<tr>
<th>Table 5.3 Type of prescribing activity in each PCT</th>
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<tbody>
<tr>
<td><strong>Type of activity</strong></td>
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<tr>
<td><strong>Guidelines and formularies</strong></td>
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<tr>
<td><strong>Prescribing incentive scheme</strong></td>
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<tr>
<td><strong>Workshops and meetings</strong></td>
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<tr>
<td><strong>Other prescribing activities</strong></td>
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</table>
5.3.2 Evaluation of the prescribing incentive schemes

Similar prescribing audits were included in both PCTs' PISs over the two years (table 5.4) which was unsurprising as several of the audits were appointed by national authorities e.g. 'generic prescribing' and 'financial targets' or were part of NICE or NSF guidance e.g. atypical antipsychotics, benzodiazepines and Proton Pump Inhibitors (PPIs). Outcome measures were the same in the two PCTs except for a couple of cases; generic prescribing and NSAIDs (table 5.4). In addition to the prescribed audits practices in PCT1 had an option to design their own audit; 'any other audit chosen by the practice agreed with the PCT Prescribing Team'.

Table 5.4 Contents of PISs in the PCTs in year 2000/01 and 2001/2002

<table>
<thead>
<tr>
<th>Audit</th>
<th>Outcome measure</th>
<th>PCT1 2000/01</th>
<th>PCT1 2001/02</th>
<th>PCT2 2000/01</th>
<th>PCT2 2001/02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotics</td>
<td>PCT1: A 'threshold' of prescribing rates per 1000 PU should be achieved.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>PCT2: 75% should be comprised of the Top 10 antibiotics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>A 'threshold value' per 1000 PU should be achieved</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drugs of limited clinical value</td>
<td>New numerical targets set, building on last years targets (no detail further detail was given)</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Emollient preparations</td>
<td>A 'threshold value' per 1000 PU should be achieved</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial targets</td>
<td>To remain within practice prescribing budget</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Generic prescribing</td>
<td>PCT1: To achieve rate of 72% or increase by 5% if 55% or above. To increase rate by 10% if under 55% PCT2: To achieve a rate of 72% or increase by 10% if under 62%</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Medication review</td>
<td>To develop a protocol</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental health</td>
<td>To review prescribing of antidepressants, anxiolytics/hypnotics, and antipsychotics</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>NSAIDs</td>
<td>PCT1: A 'threshold' of prescribing rates per 1000 PU should be achieved.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>PCT2: Minimum generic prescribing rate 80%, 70% should be of the Top 4 drugs as recommended by the Audit Commission</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPIs</td>
<td>Numerical target based on literature review (no further details given)</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Repeat prescribing</td>
<td>To develop a policy. If policy exists to work according to this and to assess it against guidelines developed by the PCT</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Treatment of dyspepsia</td>
<td>A 'threshold value' per 1000 PU should be achieved</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Practices’ achievements on the PISs in 2000/01 and 2001/02 were compared between the clusters in PCT1. Practices that were not clustered were also included in the experiment, making 50 practices in total. The lack of full data in PCT2 prevented the same analysis in this PCT. As the PISs in 2000/01 and 2001/02 included nearly identical audits and the rewards for completing the audits were the same for both years the amount of incentive money paid out per WTE GP per practice was used to compare practices’ performance over the two years.

The mean reward was highest in cluster 3 in both years and these practices also received a reward in both years as opposed to the practices in clusters 1 and 2 (table 5.5).

Table 5.5 Reward money received for the PISs in clusters

<table>
<thead>
<tr>
<th>Cluster (number of practices)</th>
<th>2000/01 reward per WTE GP (£)</th>
<th>2001/02 reward per WTE GP (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Minimum</td>
</tr>
<tr>
<td>1 (9)</td>
<td>1089</td>
<td>400</td>
</tr>
<tr>
<td>2 (7)</td>
<td>1071</td>
<td>0</td>
</tr>
<tr>
<td>3 (8)</td>
<td>1225</td>
<td>1000</td>
</tr>
<tr>
<td>Non-cluster. (26)</td>
<td>1058</td>
<td>0</td>
</tr>
<tr>
<td>Total (50)</td>
<td>1092</td>
<td>0</td>
</tr>
</tbody>
</table>

The overlapping 95% confidence intervals showed that there was, with a probability of 0.05, no difference in the performance in each cluster over the two years and between the clusters except for the non-clustered GPs who received significantly lower rewards compared to GPs in cluster 3 in the second year (figure 5.4).
Levene's test was applied to evaluate if there was a greater variation in the achievements in the second year compared to the first; the confidence intervals tended to be wider in all clusters the second year. The distribution of cases was close to normal and thus fulfilled the requirement of a normal distribution for a parametric test. Levene's test confirmed that the variances were unequal between the two years in the total sample (F=16.228; p<0.001) as well as in the non-clustered practices (F=11.256; p=0.002). This suggested that the range of achievements were different in the total sample between the two years and the same applied to the non-clustered practices. An independent sample t-test showed no significant differences between the mean rewards in 2000/01 and 2001/02 in any of the clusters.

5.3.3 Comparing prescribing trends between PCT1 and PCT2
This experiment aimed to establish whether there were any differences in prescribing between the PCTs. Table 5.6 summaries the current prescribing trends and how the PCTs would like to see the advancement within each prescribing indicator. The aims of improvement within each prescribing area were the same for the two PCTs and built on national recommendations for prescribing such as the NICE guidance and the NSFs. Prescribing in the PCTs performed in line with aims on those indicators marked green
in table 5.6, but the target may not have been fully met. Prescribing on indicators marked in red did not show trends in the desired direction which indicated areas where prescribing support may be needed. Of the 13 indicators both PCTs performed on 9 (table 5.6). Both PCTs performed on the same indicators but on 7 of them there was a slight difference in degree of performance. PCT2 performed better on the majority of these 6 cases. Some of the prescribing indicators are discussed in more detail below.

Table 5.6 Current prescribing trends of selected indicators

<table>
<thead>
<tr>
<th>Prescribing indicator</th>
<th>Aim of the PCT(^1)</th>
<th>Trend in PCT1</th>
<th>Trend in PCT2</th>
<th>Differences between PCTs</th>
</tr>
</thead>
<tbody>
<tr>
<td>All and ACE Inhibitors (volume)</td>
<td>High</td>
<td>Increasing</td>
<td>Increasing</td>
<td>PCT2 possibly higher volume(^2)</td>
</tr>
<tr>
<td>Antibacterial drugs (cost)</td>
<td>Low</td>
<td>Slightly increasing</td>
<td>Slightly increasing</td>
<td>PCT2 possibly higher cost(^2)</td>
</tr>
<tr>
<td>Antibacterial drugs* (item)</td>
<td>Low</td>
<td>Decreasing</td>
<td>Decreasing</td>
<td>PCT2 possibly higher volume(^2)</td>
</tr>
<tr>
<td>Atypical antipsychotics* (percentage)</td>
<td>High</td>
<td>Increasing</td>
<td>Increasing</td>
<td>PCT1 possibly higher(^2)</td>
</tr>
<tr>
<td>Benzodiazepines* (volume)</td>
<td>Low</td>
<td>Decreasing</td>
<td>Decreasing</td>
<td>No</td>
</tr>
<tr>
<td>Cox -2 Inhibitors (volume)</td>
<td>Low</td>
<td>Increasing</td>
<td>Increasing</td>
<td>No</td>
</tr>
<tr>
<td>Drugs of Limited Clinical Value (DLCV) (cost)</td>
<td>Low</td>
<td>Decreasing</td>
<td>Decreasing</td>
<td>PCT2 lower volume</td>
</tr>
<tr>
<td>Generic Items (percentage)</td>
<td>High</td>
<td>Increasing but tailing off</td>
<td>Increasing but tailing off</td>
<td>No</td>
</tr>
<tr>
<td>New Drugs (cost)</td>
<td>Low</td>
<td>Increasing and then decreasing</td>
<td>Increasing and then decreasing</td>
<td>No</td>
</tr>
<tr>
<td>NSAIDs (volume)</td>
<td>Low</td>
<td>Decreasing, now possibly increasing</td>
<td>Decreasing, now possibly increasing</td>
<td>No</td>
</tr>
<tr>
<td>Statins (volume)</td>
<td>High</td>
<td>Increasing</td>
<td>Increasing</td>
<td>PCT2 higher volume</td>
</tr>
<tr>
<td>Total Prescribing (cost)</td>
<td>Low</td>
<td>Increasing</td>
<td>Increasing</td>
<td>No</td>
</tr>
<tr>
<td>Ulcer Healing drugs (volume)</td>
<td>Low</td>
<td>Increasing</td>
<td>Increasing</td>
<td>PCT2 higher volume</td>
</tr>
</tbody>
</table>

*Indicator used by Commission for Health Improvement

\(^1\) The aim of each prescribing area was discussed in meetings with the Prescribing Team in both PCTs but no numerical targets were given. Confirmation of the presented aims was made with the Pharmaceutical Advisors via email in February, 2004.

\(^2\) The 95% confidence intervals were slightly or partly overlapping

Ulcer healing drugs

Due to the high costs of some ulcer healing drugs, the Proton Pump Inhibitors (PPIs), dyspepsia was in focus according to both PCTs. The prescribing of ulcer healing drugs was increasing in both PCTs (figure 5.5a) but GPs in PCT1 prescribed a lower volume. A peak in prescribing was in seen in October 2000 in PCT2 with a decline in the following quarter but no activities around ulcer healing drugs were recorded for the complete GP population at that time. NICE technology appraisal in July 2000 generated no decline in prescribing of PPIs in PCT2 but perhaps dampened an even greater
increase. Prescribing dropped in Jan 2002 in both PCTs but no local prescribing activities around ulcer healing drugs were recorded at this time. PCT1 undertook educational outreach on PPIs in Jul-Sep 2002 and if anything, the prescribing of PPIs actually increased slightly in this quarter. The updated formulary chapter on gastrointestinal treatment was sent out to practices in PCT1 in Oct-Jan 2002/03; the following quarter showed a slight increased prescribing of PPIs. Dyspepsia audits or audits on proton pump inhibitors were included in the PIS in both PCTs in 2000/01 and 2001/02. Overall, local and national prescribing activities had limited effect on prescribing of PPIs in both PCTs.

![Figure 5.5a Prescribing of ulcer healing drugs in the PCTs](image)

**New drugs**

None of the PCTs had any prescribing activities discussing the prescribing of new drugs which is noteworthy when it is recognised that prescribing of new drugs is costly and can be associated with safety problems (figure 5.5b). Thus, the fluctuations in the curve could only be speculated. The budget year runs from April each year and perhaps the practices were more conservative in using new (and expensive) drugs at the beginning of a budget year. Such a theory could be applied to the sudden drop in prescribing in April 2003 but not to the trends in April 2002 or April 2001. The prescribing trend
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could also reflect the number of drugs labeled new drugs that were on the market at each time point; perhaps there were more new drugs on the market in April 2003 than in April 2002. The graph could display part of a cyclical pattern but more data points would be needed to establish whether this was so. The PACT database is dependent on updates from the Committee for Safety of Medicines that label drugs as ‘new’ (section 5.3.4). Potentially, a large number of drugs may have been taken off the ‘new drugs’ list in April 2003 which could explain the sudden drop. No conclusions could be made of why prescribing of new drugs fluctuated but the similar pattern in both PCTs suggested attribution to external factors. The trends in both PCTs also highlighted there was potential for savings to be made.

![Figure 5.5b Prescribing of new drugs in the PCTs](image)

**Figure 5.5b** Prescribing of new drugs in the PCTs

**All prescribing**

There was a tendency that PCT2 had overall higher prescribing costs than PCT1 (figure 5.5c). Trends in total prescribing could not be attributed to a specific prescribing activity; in fact all activities that had been undertaken may have contributed to the trend. The lower overall costs in PCT1 may be attributed to more effective prescribing activities than PCT2. The effect of prescribing initiatives could have been evaluated if a matched control group had been available. It is unknown what caused the drop in
prescribing in, especially, PCT2 in January 2002 and what brought the increase in the following quarter. The fact that the PCT1 Head Pharmaceutical Advisor post was vacant between Jan-Jul 2002 could have contributed to the increase seen during this time but an even greater increase was seen in PCT2 at this time. A similar trend of decreased prescribing before the year end and an increase in the New Year was seen in January 2003; possibly the Christmas holidays contributed to fewer prescriptions issued if fewer patients attended surgeries. Price increases in the New Year could also be postulated. Overall, prescribing costs were increasing steadily and no recorded prescribing initiatives had managed to shift the curve downwards.

![Graph](image)

Figure 5.5c Total prescribing in PCTs

**Atypical antipsychotics**

The increase in atypical antipsychotic prescribing showed a linear trend in both PCTs but there was a tendency of higher prescribing in PCT1 before April 2001; after this time point the tendency was less pronounced (figure 5.5d). The higher prescribing volume in PCT1 could be due to the different populations in the PCTs; PCT1 has a higher rate of people with African Caribbean background than PCT2. The Race Equality Scheme in PCT1 states that the rate of admission for serious mental illness is 2.5 times higher in the African Caribbean male population than in the white male
population in the PCT. NICE published a guideline for schizophrenia in December 2002 and a technological appraisal recommending atypical antipsychotics as first line treatment in June 2002. No major shifts in trends were seen around these time points however. Perhaps this was explained by the NICE statement that a patient stable on standard antipsychotic therapy should not be switched to atypicals. This meant that only new cases of schizophrenia and those patients who had problems with standard antipsychotics were initiated or switched to atypicals.

Mental health was included in the PCT2 PIS in 2000/01 but there were only a few data points prior to this so it was not possible to establish whether this contributed to any change in the prescribing trend. Similarly, the effect of the NSF in mental health published in September 1999 was not evaluative in the presented time frame. The NFS said that atypicals may offer reduced side-effects but did not promote these drugs. Therefore only small effects would be expected from this publication. As antipsychotics are initiated in secondary care, prescribing review should include the interface.

![Prescribing of atypical antipsychotics to standard antipsychotics in PCTs](image)

Figure 5.5d Prescribing of atypical antipsychotics to standard antipsychotics in PCTs
Drugs of Limited Clinical Value

There was a fluctuating but downward prescribing trend in both PCTs of Drugs with Limited Clinical Value (DLCV) but more rapidly so in PCT2 (figure 5.5e). A seasonal pattern was seen in PCT1 while less pronounced in PCT2. By October 2001 the prescribing trends in the PCTs became significantly different. Perhaps, the lower prescribing in PCT2 could be explained by having DLCV included in the PISs in 2000/01 and 2001/02, whereas PCT1 only had emollient preparations included in year 2000/01. The prescribing of emollients was twice the national average in PCT1 in 2000 as stated in their PIS for 2001/02. There was a considerable variation between practices and the patient population may contribute to the overall high rate of prescribing of emollients. The PCT recommended that GPs should use less costly equivalents.

Perhaps the prescribing of these types of drugs could be cut back if patients were given longer consultation times giving time for the doctor to explain that these drugs only have a limited effect and therefore should not be prescribed. The extension of patient consultation time has been debated for decades, but literature is inconclusive of its impact on prescribing. Parish (1973) compared England to other countries with longer consultation times and concluded that these countries had as large increases in prescribing as England did. The article did not however say whether the prescribing levels were comparable between the countries. In conclusion, the PIS seemed to have contributed to the decreasing trend of prescribing of DLCV in PCT2 suggesting that PCT1 should use the same approach.
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Figure 5.5e Prescribing of drugs of limited clinical value in PCTs

Statins
Prescribing volumes of statins were significantly higher in PCT2 compared to PCT1 (figure 5.5f). Prescribing of statins increased more rapidly in PCT2 than in PCT1 from January 2002 which could be explained by NICE’s recommendations to use statins for patients at high risk for a coronary heart disease event but that other patients benefit little. A less steep prescribing curve in PCT1 could indicate a slower, or lower, uptake of this guidance.

A prescribing project on statins was launched in PCT2 in Jul-Sep 2002 and policy of prescribing was discussed with the hospital trust in Jan-Mar and Jul-Sep 2003. As presented in section 3.8.2.1 and 3.8.3.1, CHD was above national averages in both PCTs. PCT1 did not however record any prescribing activities specifically focusing on statin prescribing.

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Statins (ADQ/STAR-PU)

Figure 5.5f Prescribing of statins in PCTs
5.3.4 Comparing prescribing trends between clusters

This experiment aimed to establish whether there were any differences in prescribing between the clusters in PCT1. Cluster allocation was determined by perceptions of influences on prescribing (chapter 4).

Antibiotics
The graph showed that antibiotic prescribing was subject to a seasonal pattern which is of no surprise as people have more cold and flu symptoms in the winter. It is also known that non-indicated prescribing of antibiotics prevails and that this is also higher in the winter season when patients come and ask for an antibiotic for their cold.

The 95% confidence intervals indicated no significant difference between the clusters although the average prescribing volume tended to be higher in cluster 1 and lower in cluster 3 (figure 5.6a). All clusters were meeting the target of prescribing less than 0.30 Items/STAR-PU. The peak volumes were decreasing in all clusters over time but the seasonal pattern remained. The PCT held a prescribing workshop on antibiotics in October 2001 and antibiotics were also an optional audit on the 2000/01 and 2001/02 PISs. Peak volumes were curbed in the winter period that followed the workshop, especially in cluster 1. The prescribed volumes in the summer of 2001 were however lower than in the summer of 2000.

Another antibiotic workshop was held in February 2002 targeting GPs that prescribed high volumes of antibiotics. Prescribers in cluster 1 decreased their antibiotic prescribing at a greater rate than did GPs in the other clusters. It was not known however if the GPs in cluster 1 attended this workshop and thus the discussed effect cannot be ascribed to this intervention with certainty. GPs in cluster 1 prescribed less antibiotic drugs in Jan-Mar 2002 than in the corresponding quarter a year earlier which suggested uptake of advice to decrease antibiotic prescribing. Informed by the seasonal pattern it could be suggested that the additional workshop should have been held in the autumn before the prescribing peaked.

It has been reported that GPs feel less responsible for antibiotic resistance and blame secondary care (Kumar et al., 2003), even though there is evidence that patterns of
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Antibiotic usage in primary care have a strong impact on resistance (Metlay, 2002). Resistance is related to both volumes of prescribed antibiotics and to patterns of usage. In light of this, PCTs should continue to monitor prescribing volumes and promote conservative usage via formularies and guidelines in order to ensure usage that limits resistance.

![Figure 5.6a Prescribing of antibiotics in clusters](image)

**Figure 5.6a Prescribing of antibiotics in clusters**

**Cox-II selective inhibitors**

Cluster 2 and 3 GPs displayed increasingly wide confidence intervals from July 2001 which indicated that variation in prescribing between GPs in these cluster widened. This was also true for cluster 1 to some extent. The reason for the widening confidence interval should be investigated and dealt with as it could be a sign of unequal care provision. NICE published guidance on Cox-IIs in July 2001 which were less restrictive in their recommendations of Cox-II than the PCTs had hoped and the NICE guidance had in this way ‘opened a door’ for the pharmaceutical industry to increase prescribing of Cox-IIs (personal communication, Pharmaceutical Advisor PCTX, 13/08/02). Perhaps some doctors in cluster 2 and 3 were adopting these drugs to a greater extent than other doctors. Doctors that change their prescribing rapidly have been labelled
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‘early innovators’ and are sought after by the pharmaceutical industry to make them opinion leaders for newly promoted drugs.

Cox-IIIs were not included in the PIS and there were no local initiatives launched by the PCT which may be why uptake of advice from NICE was seemingly large. With the recent withdrawal of Merck’s Vioxx® (October, 2004), it could be interesting to investigate how the prescribing of other preparations in the same class are affected.

![Cox-2 inhibitors (ADQ/STAR-PU)](image)

Figure 5.6b Prescribing of Cox-II selective inhibitors in clusters

Drugs of Limited Clinical Value

GPs in cluster 1 decreased their prescribing of DLCV during the evaluation period whereas GPs in cluster 3, which had the lowest level of prescribing of DLCV, remained on the same level throughout the evaluation period (figure 5.6c). Perhaps is it easier for more newly qualified GPs, who may not yet have built long-term relationships with their patients, to resist demands for a DLCV. An older GP, on the other hand, that has prescribed a particular DLCV for the patient for many years, may find changes of both clinical and political character more difficult to implement without jeopardising the doctor-patient relationship. In support of this, there was a mix of ages in cluster 2 where prescribing only decreased very slightly.
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Prescribing of emollients was included as an optional audit in the 2000/01 incentive scheme but due to being non-mandatory it was not possible to make any inferences of the effect on GPs prescribing. There was a seasonal variation in the amount of prescribed DLCVs which is why interventions would be best timed before an expected peak in prescribing.

New drugs
The variation in new drug prescribing in clusters seemed to be periodical; summer vacations and Christmas breaks for the drugs representatives could play a role (figure 5.6d). More data points would facilitate the investigation. It is likely that the prescribing of new drugs is related to when new drugs are launched and hence the trend seen in figure 5.6d may reflect the timing of drug launches. The Committee for Safety of Medicines determines if and how long a drug goes under label ‘new drug’ in addition to the two mandatory surveillance years. The list, and the update of the list, of new drugs in the Toolkit database determines which drugs are included in this indicator.

The graph shows a tendency towards higher prescribing of new drugs in cluster 1 than in other clusters. According to the survey (chapter 4) GPs in cluster 1 admitted more
influence from drug representatives and reported more frequent visits from them than did GPs in the other clusters. Prosser and colleagues (2003) said that GPs are not actively seeking information on new drugs so when targeted by the industry it is not surprising that the commercial information plays a large part in GPs decisions whether to adopt the new drug. The pharmaceutical industry is responsible for raising GPs' awareness of a new drug and drug representatives are an important source of influence for GPs when prescribing new drugs (Jones et al., 2001a). It should also be noted that the uptake of new drugs is slower in the UK than in other EU countries and GPs are known to be conservative prescribers (Prosser et al., 2003). No activities relating specifically to prescribing of new drugs, such as policies and advice on how to deal with commercial influence, were reported by the PCT.

It has been shown that prescribers with low prescribing of new drugs are more cost-conscious than high prescribers of new drugs. Low prescribers also accept practice policies and are more likely to use a formulary (Jacoby et al., 2003). A Danish study found that young female doctors were the most consistent late innovators in the uptake of new drugs (Steffensen et al., 1999). This finding supports what is known about cluster 3 GPs in this thesis.

![Figure 5.6d Prescribing of new drugs in clusters](image)
5.3.5 **ARIMA and intervention analysis**

The purpose of this experiment was to quantify the effect of prescribing interventions on percentage generic prescribing in clusters.

Practices that belonged to cluster 3 tended to prescribe a greater generic percentage than those that belonged to cluster 1 (figure 5.7). From the sequence graph it seemed that generic prescribing increased in all clusters during the evaluation period but more rapidly so in cluster 1 than in cluster 2 and 3.

![Percentage Generic Items (Generic items/items)](image)

**Figure 5.7 Percentage generic prescribing in clusters. Red lines represent submission deadlines for the PISs**

A ‘dummy’ variable was inserted that marked the time points of the intervention; deadline for the PIS, and measured the shape of the curve before and after the intervention based on assigned ARIMA model. The intervention analysis was performed twice; once for each of July 2001 and July 2002. The rationale for the selection of time points for investigation was that the practices assessed their generic prescribing prior to the PIS was due in and that they relaxed their prescribing self-control till the next year’s scheme was launched (table 5.7).
Table 5.7 Time plan for the PISs in PCT1

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Launch of new scheme</td>
<td>October 2000</td>
</tr>
<tr>
<td>Deadline</td>
<td>July 2001</td>
</tr>
<tr>
<td>Results announced to practices</td>
<td>September 2001</td>
</tr>
<tr>
<td>Launch of new scheme</td>
<td>November 2001</td>
</tr>
<tr>
<td>Deadline</td>
<td>July 2002</td>
</tr>
<tr>
<td>Results announced to practices</td>
<td>September/October 2002</td>
</tr>
<tr>
<td>Launch</td>
<td>October/November 2002</td>
</tr>
</tbody>
</table>

A classic ARIMA (1,0,0) model provided the best solution for the generic prescribing as guided by the Autocorrelation Function (ACF) and the Partial Autocorrelation Function (PACF) (figures 5.8 and 5.9). Lags that were nonsignificant i.e. lags within the confidence intervals could be treated as zero and therefore not contribute towards selection of ARIMA model (SPSS Inc., 1993). The fit of the model was satisfactory and the residuals varied randomly indicating that the appropriate ARIMA model had been selected.

Figure 5.8 Autocorrelation function for total sample generic prescribing
Figure 5.9 Partial autocorrelation function for total sample generic prescribing

According to intervention analysis calculations, generic prescribing improved significantly at the time of the deadline in 2000/01 but no such improvement was seen in the second year of the same intervention. Table 5.8 shows that the increased percentage generic prescribing was greatest when including the whole PCT and not just the practices that were clustered; an increase of approximately 7% was seen at the deadline of the PIS. Practices that belonged to cluster 1 increased their generic prescribing the most (5.9%) while no significant increase was seen in cluster 2. There was also a significant increase in prescribing of generics amongst practices that belonged to cluster 3 (3%).

Table 5.8 ARIMA regression coefficients for improvements of the 2000/01 PIS

<table>
<thead>
<tr>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
<th>Cluster 1-3</th>
<th>All practices in PCT1</th>
</tr>
</thead>
<tbody>
<tr>
<td>B=5.86;p=0.0017</td>
<td>B=1.38;p=0.1238</td>
<td>B=2.63;p=0.0068</td>
<td>B=3.06; p=0.014</td>
<td>B=6.978;p&lt;0.0001</td>
</tr>
</tbody>
</table>

5.3.6 Prescribing in different populations

The purpose of this experiment was to investigate prescribing patterns in two practices in PCT1 where the patient populations were different but the principal prescriber the same GP.
The two practices were coded as A; the group practice and B; the smaller practice with a distinct patient population. Practice B had a prescribing pattern that was distinctly different from practice A and from the mean PCT prescribing throughout. Practice B was an outlier and taken out in the previously presented experiments. A selection of prescribing indicators is discussed below to illustrate the potential relationship between population and prescribing patterns. Graphs display prescribing in practice A, B and the mean PCT1 prescribing.

Total cost of prescribing, generics and new drugs
The generic prescribing rate was lower in practice B suggesting that less attention was paid to national and local imperative of generic prescribing; perhaps were the GPs in practice B less concerned with costs as compared with the GPs in practice A (figure 5.10a). Practice B was at times prescribing less than half the drugs generically which was a cause for concern as stated in the PCT’s PIS. Practice B had high prescribing costs (figure 10b) which was no surprise as generic prescribing was low and the prescribing of new drugs was fluctuating, yet high (figure 10c).

Figure 5.10a Prescribing of generics in the two practices
Mean of PCT1 with 95% confidence intervals displayed as reference points
Describing and explaining prescribing trends: Results

Figure 5.10b Total prescribing in the two practices
Mean of PCT1 with 95% confidence intervals displayed as reference points

Figure 5.10c Prescribing of new drugs in the two practices
Mean of PCT1 with 95% confidence intervals displayed as reference points
Describing and explaining prescribing trends: Results

Prescribing for cardiovascular disease
The prescribing for cardiovascular conditions (drugs affecting the rennin-angiotensin system and statins) was greater in practice B than in practice A which could be explained by the predominantly male and elderly population in practice B (figure 5.10d and 5.10e respectively). Although the prescribing indicators are adjusted for patient demographics (section 3.3.3) a population that is vastly different from ‘normal’ may not be fully compensated.

Figure 5.10d Prescribing of drugs affecting the rennin-angiotensin system in the two practices
Mean of PCT1 with 95% confidence intervals displayed as reference points
Figure 5.10c Prescribing of statins in the two practices
Mean of PCT1 with 95% confidence intervals displayed as reference points
Atypical antipsychotics

There were no patients that were prescribed atypical antipsychotics in practice B which could be explained by the majority of the population being drawn from a specific type of professional group which psychotic patients may have difficulties to sustain (figure 5.1Of).

Figure 5.1Of Prescribing of atypical antipsychotics to standard antipsychotics in the two practices Mean of PCT1 with 95% confidence intervals displayed as reference points
Antibiotics and NSAIDs

The prescribing of antibiotics and NSAIDs were much higher in practice B than in the PCT in general (figure 5.10g and 5.10h respectively). This prescribing may not be clinically appropriate and could be difficult to justify on a population basis. Prescribing of antibiotics was far from target in practice B (0.30 Items/STAR-PU). Prescribing of both drug groups should be discussed with the practice and revised as appropriate.

Figure 5.10g Prescribing of antibiotics in the two practices
Mean of PCT1 with 95% confidence intervals displayed as reference points
Figure 5.10b Prescribing of NSAIDs in the two practices
Mean of PCT1 with 95% confidence intervals displayed as reference points
Benzodiazepines

It was interesting to observe that prescribing of benzodiazepines had decreased in practice B and was in line with the rest of the practices in PCT1 by October 2001 (figure 5.10i). It was not known why this was so, but possibly the prescriber in practice B had started using the newer z-drugs in the time period October 2000-2001. These z-drugs were, as previously mentioned, not included in the benzodiazepine indicator. Benzodiazepines were not included in the PCT1 PIS or launched in the NICE and NSFs during October 2000-2001.

Figure 5.10i Prescribing of benzodiazepines in the two practices
Mean of PCT1 with 95% confidence intervals displayed as reference points
5.4 DISCUSSION

5.4.1 Introduction
The experiments investigated differences in prescribing between the three clusters, between the two PCTs and between two patient populations. Results concluded that prescribing patterns were at times significantly different in practices. Experiments on prescribing trends could be further refined and conclusive if records were kept of each practice's partaking in local initiatives and which PIS audits were selected.

Conclusions as to whether the differences in prescribing were legitimate and appropriate are outstanding as no quality assessment of prescribing was undertaken in this project. Following quality assessment, decisions on how to handle these differences should be made; should practices that prescribe 'inappropriately' be targeted, if so, how and with what type of interventions? Through the new GMS contract some payments to GPs will be quality based, or at least based on proxy indicators for quality. Such arrangements will hopefully push development of reliable and valid indicators for measuring the quality of prescribing.

5.4.2 Comparison of local prescribing activities in the PCTs
In total, there seemed to have been an equal amount and similar type of prescribing activities in both PCTs in the investigated time period (2000-2003) although PCT2 recorded more activities in the first two years, suggesting that this PCT was quicker to introduce activities. Both PCTs had included a mix of activities that were important for prescribing management; development of local formularies and guidelines, educational outreach and workshops in priority areas, and a yearly PIS.

No investigations on how the activities were undertaken, who participated, or the timing of them were made as such details were not available. The information was still useful in relating the prescribing trends of the two PCTs. Faced by the sparse detail of reported data it was suggested that the PCTs should record all their interventions in more detail and in a structured way. The PCTs could then relate this data to prescribing trends and evaluate their efforts accordingly.
5.4.3 Evaluation of the prescribing incentive schemes

The PISs were similar in the two PCTs terms of therapeutic areas, targets and sums of reward. If the PISs determined prescribing, there would be little difference in prescribing trends in the PCTs. This discussion continues in section 5.4.4.

Most targets were specified numerically to the practices but not all (table 5.4); especially, PCT2 did not always give exact guidance of what was required for the achievement of reward. This gave the PCT advisors greater freedom in deciding on rewards for the practice but may have diminished the efforts of practices to reach targets. Empowerment to self-monitor may have been encouraged in PCT1 by allowing practices to design their own PIS audits. Such actions are beneficial in making GPs responsible of their own prescribing.

There was no difference between clusters in the mean payment rewards. Whether this finding was considered ‘good’ or ‘bad’ would depend on what grounds the PIS was built, whether i) the targets were set so that all practices could (read should) be successful or ii) targets were set so that significant quality improvements in prescribing were achieved across the PCT, or iii) targets were set so that reward money was balanced against savings in prescribing costs. These aims are not mutually exclusive and the aims of the PIS may extend further than the above mentioned. The PCTs should make the purpose of the PIS explicit to GPs and they should know what expectations the PCTs have.

There was a greater range of total achievements in the second year; potentially practices that succeeded in 2000/01 were spurred to do even better the next year while the practices that failed in the first year could have been discouraged the following year. Alternatively, there could have been different competing initiatives and a higher workload in the two years which dispersed the practices, or the provider side may have used different implementation tools in the two years. A significant difference in performance between the years was also found amongst the non-clustered practices. The reason for this was not known but could potentially be attributed merely to the greater number of non-clustered practices. Although not statistically supported it can be hypothesised that cluster 3 were best at achieving the targets, followed by cluster 1 practices that may have enjoyed the extra money to be earned from the PIS, while
Describing and explaining prescribing trends: Discussion

cluster 2 practices did not pay as much attention as the other practices clusters. Perhaps were there different drivers behind achievements in the clusters that contributed to the results.

The maximum pay for achievements on the PIS was set to £1,500 per WTE GP in both years as stated in the PIS and reported by the prescribing advisor. Nevertheless, some practices retrieved more than £1,500 in 2001/02. The reason for this was unknown but perhaps these practices undertook additional audits that the PCT rewarded. These 13 (26%) practices were recoded at £1,500 to allow for comparison between groups.

5.4.4 Comparing prescribing trends between PCT1 and PCT2

Although differences between PCTs were small, it was shown that the prescribing trends in PCT2 were at times closer to the aims of the authorities (table 5.6). It should be remembered however, that appropriateness of prescribing cannot be determined with PACT data. Considering the example with statins; national recommendations said that the prescribing of statins and ACE inhibitors ought to increase, but only where appropriate. GPs in PCT2 did prescribe more statins and possibly more ACE inhibitors than GPs in PCT1, but no inference to appropriateness could be made with PACT data alone. Therefore, the higher prescribing in PCT2 could potentially have been inappropriate; for example if non-indicated patients were prescribed statins.

The 95% confidential intervals were at times wider in PCT2 than in PCT1 (e.g. statins and total prescribing) which indicated a greater variation in prescribing between practices. The 95% confidence interval was also wider on prescribing data not reported in the thesis, such as volume of benzodiazepines, antibiotics, PPIs, NSAIDs and ACE inhibitors. The higher number of practices in PCT1 could be the reason for this; as the sample size increases the confidence interval often decreases keeping in mind that if the population is not normally distributed the opposite effect can also be seen.

The experiment showed that local initiatives varied in their effect; prescribing of ulcer healing drugs was increasing although both PCTs had put extra efforts into shifting this trend while incorporation into the PISs made prescribing of DLCV decrease. National initiatives rarely explained trends and had often only limited effects.
Explanations to the differences in prescribing between the PCTs were suggested and discussed but the list was not exhaustive; there may be other factors causing differences between the PCTs than the ones mentioned in table 5.9. Likewise, no conclusions could be made as to why prescribing was sometimes different between the PCTs or what comprised the greatest difference.

<table>
<thead>
<tr>
<th>Argument for differences in prescribing</th>
<th>Counter argument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Different patient populations in the PCTs</td>
<td>Patient populations were similar in the PCTs (Chapter 3)</td>
</tr>
<tr>
<td>Different characteristics of the practices in the PCT</td>
<td>Investigated characteristics were similar (Chapter 4)</td>
</tr>
<tr>
<td>Different GP demographics</td>
<td>Demographics were similar (Chapter 4)</td>
</tr>
<tr>
<td>Different types of local prescribing initiatives</td>
<td>Initiatives varied slightly but the PISs were similar. No investigation was made of conduct of initiatives (Chapter 5)</td>
</tr>
<tr>
<td>Different organisation and running of the PCT and its prescribing support</td>
<td>There were some differences but practices visits by PAs had similar purposes as they were guided by national imperatives (Chapter 1)</td>
</tr>
</tbody>
</table>

5.4.5 Comparing prescribing trends between clusters

GPs in cluster 1 were generally furthest away from national and local aims of prescribing, but this can not be equated with a worse quality of prescribing as trends could not be linked to clinical patient data. Some of the utilised prescribing indicators were however 'proxy-indicators' for quality; antibiotics, benzodiazepines and atypical antipsychotics. Prescribing of antibiotics decreased the most in cluster 1 and became in line with recommendations but still remained higher than prescribing in the other clusters. As shown in the cluster analysis (chapter 4), GPs in cluster 1 were generally more positive towards drug representatives and had more frequent contact with them. Watkins et al. (2003) found that GPs who were in contact with the pharmaceutical industry on a regular basis had higher prescribing costs and prescribed less appropriately. Cluster 1 GPs were also qualified earlier; older age has been related to higher prescribing (Webb and Lloyd, 1994).

The applied confidence intervals were wide in cluster 2 suggesting that GPs in this cluster differed in their prescribing profiles. An increased sample size could potentially clarify this assumption. Practices in cluster 3 showed a narrower confidence interval than the other clusters on all prescribing indicators. As the number of practices in
Describing and explaining prescribing trends: Discussion

Cluster 3 were similar to the number in other clusters the reason must be prescribing itself; that GPs within cluster 3 prescribed more alike. Cluster 3 practices had a similar profile; they were larger and had teaching status whereas there was a greater mix of demographics and characteristics in cluster 2. Except for attracting GPs with similar demographics, did cluster 3 practices also attract a similar patient population which in turn generated a similar prescribing profile?

The increase of Cox-IIs could have different reasons in different clusters. As known from chapter 4, cluster 2 and 3 GPs did not seek advice from drug representatives but instead they took advice from independent and evidence based sources; perhaps did NICE guidance qualify as this? The GPs in cluster 1 who saw drug representatives may have got the message to prescribe Cox-IIs via them. This could be an example of how influence and effect could stem from different sources.

PCTs should be prepared to counteract prescribing messages promptly to block development of unwanted prescribing habits to avoid developments as with the prescribing of Cox-IIs.

5.4.6 ARIMA and intervention analysis

There is a limit for how high percentage generic prescribing can be achieved as some drugs are not available as generic formulations. It was therefore not surprising that practices with already high generic prescribing, such as cluster 3 practices, increased their prescribing less than practices with a lower starting point (cluster 1 practices).

Explanations as to why no significant increase in percentage generic prescribing was seen in cluster 2 were that either i) there was no significant increase, ii) there was a time lag in the increase which was not picked up during the investigation time period, or iii) the increase was short lived and disappeared before detection. Significant changes were seen in the other clusters during the same time period and thus alternatives ii) and iii) seem less plausible. Thus, there was no significant improvement of generic percentage prescribing in cluster 2. Perhaps GPs in cluster 2 were less interested in the PIS; from interviews in chapter 4 it was learnt that cluster 2 GPs expressed more uncertainty about the value of both PAs and PCT formularies and said that they used alternative sources for prescribing information.
The ARIMA technique with applied intervention analysis described the principle for investigations which should be tested on other prescribing indicators by applying different interventions. Further investigations through ARIMA time series analysis would benefit from a more flexible prescribing database, where individual prescriber and monthly data was available over a longer time period than three years. Forecasting of prescribing data would similarly benefit from such improvements and could be useful when planning prescribing support; when and for whom?

5.4.7 Prescribing in different populations

It is widely known that prescribing habits vary between countries, practices and individual doctors. The variations on practice and individual level are due to factors like the size of the practice and the population it serves, practice status (teaching practice and non-teaching practice) and GP demographics and characteristics.

It can be held that the GPs have the most power in the prescribing process; unless they issue a prescription, no data will ultimately be recorded in the PACT database. Thus, the large difference between prescribing in practice A and B was due to the GPs working in each practice. Prescribing is however, and should be, a dynamic process that is steered and influenced by many factors as explained throughout this thesis. It is recognised that practice population is part of this dynamic equation. Denominators in the PACT database are adjusted for differences in practice populations such as age and gender but the weighting only accounts for about 25% of practice variations (Roberts and Harris, 1993). Thus, the argument for impact of population on prescribing is supported.

There are however alternative explanations to the different prescribing patterns in the practices; that practice A employed (at least) four GPs and thus the practice prescribing profile was made up by four GPs instead of one GP as in practice B. The principal prescriber, who was the same in practice A and B, is supposed to guide the overall prescribing of the practice and thus it could be postulated that prescribing in practice A and B should be similar. The two practices may have been different in their practice policies regarding commercial influence and how much contact they had with the PCTs. It appeared that the prescriber was quicker to adopt new drugs in practice B than in practice A, suggesting that the prescriber altered prescribing in different practices.
Describing and explaining prescribing trends: Discussion

The large fluctuations in prescribing in practice B could be caused by a population that changed in composition or a high turnover of GPs; locums may bring different prescribing habits.

It is known that certain illnesses are predisposed in certain ethnic groups, gender and ages and this can reflect prescribing of certain therapeutics, for example STAR-PUs are weighted for age and gender. In this experiment, such predisposition explained the lack of prescribing of antipsychotics and the greater prescribing for heart conditions. The two patient populations may also have different abilities for negotiating prescribing with the GP: patients in practice B were employed and of an age where they may be able to communicate their disease and demand a prescription to a greater extent than a young or an old person or people with English as a second language. The lower volumes of drugs prescribed in practice A could be explained by issues such as an inflated patient list, a population who visit the doctor less often, by a more healthy population requiring fewer drugs, or indeed by more conservative prescribing habits by the GPs in this practice. In order to gain further knowledge about population effects the prescribing profile of the principal prescriber should be compared on an individual level in both practices. At this point no such data was available and only suggestions can be made.

The outcome of this experiment showed that age, gender and ethnicity of the population seemed to have an effect on prescribing which may not be fully adjusted for by PACT denominators.

5.4.8 Methodological difficulties and limitations

The sample

The limitation of the sample used in the experiment on prescribing extends to those presented in 4.4.6.3. Those who did not identify themselves on the questionnaire were excluded and the sample was further reduced by the fact that not all practices could be matched with the principal prescriber in the PACT database. The results still showed that clusters dispersed in relation to prescribing trends but should be confirmed with a larger sample size.

The exclusion of practice ID61 caused the prescribing trend of cluster 1 and 2 to swap place on one occasion (the Antibiotic indicator) which was evidence for a small sample.
Iteration of the experiments with larger sample sizes would increase the robustness of findings.

Upon advice from the PCT personnel on the project board, the respondents in the first survey were not obliged to disclose their identity but were given an option to leave details of practice name and 62% of the population did so. Anonymity decreased the sample for prescribing data analysis as only named practices could be matched to the PACT database. In addition, the whole practice was in some cases clustered based on one survey response only. The approach was justified by a large proportion of respondents in the same practices being allocated to the same cluster (78% and 100% in PCT1 and PCT2 respectively). This suggested the existence of a practice culture in regard to prescribing which was also confirmed in validation interviews (chapter four).

Prescribing in the study PCTs was not compared with a wider population and thus nothing can be said about how these PCTs compared to other similar PCTs or to PCTs within the same SHA. This was, however, not the purpose of the thesis.

The prescribing data
The Toolkit data did not allow for individual GP analysis which is why clusters had to be arranged on practice level. As previously mentioned, cluster allocation of the whole practice was at times dependent on one or a few GPs only. Nevertheless, differences in prescribing trends could be described with current data. Further investigations should be made as to whether GPs in the same practice generally share similar values and whether these could describe prescribing cultures and how these were formed; e.g. through formal practice policies or through informal discussions and shared values.

The greater the number of prescribers within a practice, the less ‘weight’ was carried by each prescriber when looking at mean prescribing data for the whole practice. In a small practice an ‘unusual’ prescribing profile would have greater impact on the mean than in a larger practice. It was therefore considered fairer to look at prescribing data on an individual prescriber level but as previously mentioned, this level of data was not available in the Toolkit database at the time of data collection. Potential problems with individual prescriber data was that they borrowed each others prescribing pads (personal communication, Pharmaceutical Advisor, 18/06/02).
Describing and explaining prescribing trends: Discussion

The ePACT system was designed for reimbursement and audit purposes and not for research purposes which was evident by, for example, the rigidity in converting the data for input into statistical programs. Furthermore, the system made assumptions and used variables in a way which was not transparent to the user; for example, the Toolkit database automatically selected the most recent drug list to base calculations for all quarters that were withdrawn at one point in time. The impact was greater for prescribing indicators that were based on drug lists that tended to change more often e.g. 'Drugs of Limited Clinical Value' and 'new drugs'. This meant that there was a discrepancy in the data of Apr-01 and Apr-02, which was extracted from the Toolkit at one point in time, and Apr-01 and Apr-02 when extracted at another point in time. The discrepancy between the same quarters was discovered by the investigator by chance and nowhere was this data handling described in the Toolkit. The investigator found this out by phoning the PFA Support. A standard approach was taken on how to deal with such discrepancies: when two sets of data described the same quarters the data set more recent extracted data were used over the older one. Hence, this was a potential source of differences in data. However, the problem was diminished in these studies as all practices were affected in a similar manner.

As the PACT database contained dispensed prescriptions it provided a proportion of what was prescribed and not everything that was prescribed. The proportion of non-dispensed prescriptions is however unknown (Royal Pharmaceutical Society of Great Britain Homepage) but estimations of 5% to 7% have been mentioned in literature (Beardon et al., 1993). As there was no readily available data on prescribed drugs (only of dispensed drugs) the assumption in this thesis was that the non-dispensed prescriptions were evenly distributed between clusters. If prescribed and dispensed data were available, investigations on ratios of prescribed to dispensed medicines could tell which medicines were neglected by patients or indeed over-prescribed by doctors.

The differences in prescribing that was at times seen between the two PCTs or between clusters or practices were not assessed for clinical or monetary relevance. Instead, experiments were undertaken in order to demonstrate methods for comparing prescribing habits and how perceptions of prescribing influences were related to prescribing habits.
Local activity data
The information on prescribing activities was based on reports from the prescribing team in the PCTs. No details were available as to whether the information reached all GPs and which GPs took part in activities. In addition, it was not possible to conclude whether the initiatives alone had an effect on prescribing without first excluding all other possible influencing factors. This was why assumptions, but no conclusions, could be made on whether initiatives had had an effect on prescribing trends. To investigate this, a control group should be arranged or preferably a randomised controlled study should be undertaken. This was not possible to arrange during this project. A simpler, but less reliable approach would be to record which GPs took part in prescribing activities and to what extent this related to prescribing data.

Furthermore, the relationship between prescribing trends, initiatives and activities promoted by the PCTs may vary in clusters over time. Investigations of what influences prescribing must be continuous as prescribing is a dynamic process.
5.5 CONCLUSIONS

The working hypotheses for the experiments presented in the chapter were supported; there was a relationship between GPs' perceptions of prescribing, their characteristics and prescribing behaviours as evident when relating clusters to prescribing trends. There was also a relationship between PCT initiatives and prescribing trends in clusters.

The cluster theory demonstrated an outcome born observation; that perception of prescribing was related to prescribing habits. The experiments demonstrated methods for evaluating differences in prescribing between PCTs, between clusters and between practices with different patient populations. Clusters separated in their prescribing trends and experiments revealed some general prescribing patterns in each of the clusters: for example, cluster 3 GPs' prescribed, in general, closest in line with national and local recommendations whereas there was often a great variation in cluster 2 GPs' prescribing habits. Cluster 1 practices improved their prescribing the most on many indicators but these practices were also furthest away from recommendations at the start. The fact that practices showed different prescribing profiles called for individual targeting of practices in order to influence prescribing in a systematic way. The findings could be of practical use to PCTs when targeting prescribing interventions towards different practices. This is a major result as PCTs now can target GPs more effectively to better fulfil prescribing targets, and in turn create better prescribing practices for provision of better health care.

An original application to investigate and quantify the effect of prescribing initiatives was developed through ARIMA technique and applied intervention analysis. Such analysis showed potential for evaluating effectiveness of prescribing interventions and support activity. Findings also suggested that prescribing was related to patient population demographics and that PACT denominators did not fully adjust for 'extreme' populations. Conclusive explanations for differences in prescribing in the presented case study of practice A and B could not be presented but investigations around prescribing culture could potentially highlight reasons.
Describing and explaining prescribing trends: Conclusions

Overall, the two PCTs showed similar prescribing trends which would be expected given the similar patient population and location. There were however some differences in prescribing which could be explained by their use of different activities, conduct or timing of such. It was recommended that PCTs collaborate and share experiences of success and failure when working with the prescribing agenda. In order not to duplicate effort, collaboration between the PCTs should be encouraged in the development of the PISs. Such an approach could also be beneficial to bring neighbouring PCTs closer together and to increase GPs' awareness of similarities in prescribing imperatives. The readiness for joint PISs should be investigated with PCT personnel and GPs through a vote in a GP Forum meeting or alternatively through a questionnaire. A jointly sponsored research project such as this was evidence that a willingness to collaborate already existed between the PCT personnel.

The findings presented in this chapter have implications for prescribing management; novel applications of statistical modelling identified and quantified the impact of prescribing initiatives on prescribing, perhaps only initiatives that have measurable effect may be worthwhile? In this way, the PCTs could self-monitor their prescribing management and tailor messages to different prescribers; 'what works and what doesn't in each cluster'. With a detailed record of interventions effects could be precisely ascribed to prescribing trends. Such conduct is also important in order to keep in line with the increasingly litigious organisation that the NHS has become.
CHAPTER 6

COMPARING PERCEPTIONS OF PRESCRIBING OF GPs AND STAKEHOLDERS
6.1 INTRODUCTION

Literature and empirical evidence say it is a challenge for PCTs to exert influence over GP prescribing. One important reason for this is that PCTs have no means by which they can control overspending of the drug budget as the GPs; the spenders, are not employed by the PCTs (Audit Commission, 2003). It is therefore important that there is congruence in GPs’ and PCTs’ goals towards prescribing and how to achieve those goals. Identifying differences and similarities between GPs and stakeholders is one step towards dissolving barriers to change and differences in perceptions.

In this chapter, perceptions around issues of prescribing influence were investigated through semi-structured interviews in a sample of GPs and stakeholders (figure 6.1). Four themes from the interviews are presented; i) an overview of influences ii) roles of the PCT organisation, iii) PCT prescribing initiatives such as formularies and prescribing incentive schemes and lastly, iv) commercial influences. The themes from the interviews presented in this chapter further the four themes in chapter four; peers, PAs, formularies and drug representatives, but are not an expansion of them as the interviews presented in this chapter were developed and undertaken prior to the cluster model. The views of GPs are contrasted with those of stakeholders’, implications discussed and recommendations made to practice.

Figure 6.1 Chapter six: The interview study
6.1.1 Aim of the study
The aims of this study were to seek GPs' and stakeholders' in-depth perceptions about issues around prescribing that were of practical, conceptual and political character and to generate explanations to inform the prescribing management process.

6.1.2 Objectives
In order to meet these aims the following objectives were identified:

i. To undertake semi-structured interviews with a purposive sample of GPs and stakeholders

ii. To compare perceptions between GPs and stakeholders and also within each sub-group

6.1.3 Working hypothesis
GPs and stakeholders hold different perceptions of influences on prescribing and the management of prescribing.
Comparing perceptions of prescribing of GPs and stakeholders: Methods

6.2 METHODS

GPs' and stakeholders' opinions on prescribing were collected via one-to-one semi-structured interviews. The term 'stakeholders' was used as the collective name for the participating prescribing pharmacists and pharmaceutical advisors that worked in the PCTs; personnel with posts relating to prescribing within the Health Authorities (HA); and the two chief pharmacists from each of the local hospitals. Choosing a qualitative approach meant that no representativeness or generalisation was sought in a wider population; the purpose was instead to gain further understanding of the complexities of influences on prescribing in order to provide recommendations for prescribing management.

While focus groups are commonly used to explore and explain opinions their drawbacks include a lack of privacy for participants expressing their opinions and potential difficulties around convening a group at the same time and place. One-to-one interviews were thought to be easier to organise with busy GPs and stakeholders, to provide more time for each participant to express themselves in a private environment and to capture individual's opinions rather than those of a group's. Social theory was not incorporated in the study while the conduct of the interviews and the analysis process leaned towards a grounded approach.

6.2.1 Developing the interview schedule

The interview schedule, as presented in Appendix VI, was developed through three approaches; what emerged from the first survey, what was read in published literature and the investigator's own ideas regarding local matters around prescribing. The project board was consulted in order to satisfy their requirements. The questions were semi-structured, each with a set of prompts to further explore the issues raised.

The interview schedule was made up of a number of issues. The interview schedule comprised a main section that was used in interviews with both GPs and stakeholders. This section comprised issues around local and national initiatives around prescribing and prescribing management. In addition to this, the version used for GPs comprised issues from the first survey that needed further exploration; these were mainly regarding
the formulary. Interview issues and their objectives are summarised in tables 6.1 and 6.2.
<table>
<thead>
<tr>
<th>Issue</th>
<th>With the objective to investigate:</th>
</tr>
</thead>
</table>
| National prescribing initiatives          | Familiarity with Government prescribing initiatives from all interviewees and what initiatives had been absorbed by the GPs  
Whether the PCTs used Government directions as a base for their local prescribing activities  
Whether Government initiatives were perceived as helpful or not and if they were practically feasible  
The barriers and facilitators to success with Governmental initiatives  
Whether Government initiatives seemed to serve their aim to influence GP prescribing  
What pressures there were to implement and follow Governmental initiatives                                                                                                                                 |
| Local prescribing initiatives             | What prescribing activities the PCTs were involved in and how perceptions of these compared the interviewed  
Barriers and facilitators for the PCTs in achieving their aims with the local prescribing activities  
Whether there was a 'culture of blame' amongst professionals in regard to success of local prescribing interventions                                                                                                                                 |
| Implementation issues around prescribing initiatives | The implementation strategies of the PCTs' prescribing agendas and how familiar these strategies were perceived by the different interviewees  
How the communication between PCTs and GPs were co-ordinated and how effective it seemed to be                                                                                                                                 |
| Opinions of successful prescribing interventions and financial incentives | Suggestions from interviewees of an ideal prescribing intervention  
To generate ideas of format, design, development, implementation methods, financial incentives, and key issues for success  
How GPs' perceptions related to those of the stakeholders in order to be able to generate a prescribing intervention that was agreed by the party  
Ideas of what directions prescribing interventions were estimated in order to adjust for future prescribing programmes                                                                                                                                 |
| Perceptions of future prescribing schemes  |                                                                                                                                                                                                                                    |
| Role of PCTs in influencing prescribing and desire for more influence | What expectations there were on the PCTs and how they should influence prescribing  
Whether interviewees wanted more influence on prescribing and why  
Whether interviewees' views on primary care prescribing corresponded to those of the Governments’ agenda  
How views differed amongst professions                                                                                                                                 |
| Top 5 influences on GP prescribing        | What factors were perceived to influence primary care prescribing                                                                                                                                                                 |
| Main role of clinical guidelines and formularies | How interviewees viewed clinical guidelines and formularies and whether there was a difference between the two and which was preferred by the subjects                                                                                                                                 |
| The importance of a guideline/formulary   | Whether local guidelines and formularies were perceived important and useful  
How perceptions differed amongst professions                                                                                                                                                                                                 |
<p>| | |
|                                           |                                                                                                                                                                                                                                    |</p>
<table>
<thead>
<tr>
<th>Issues</th>
<th>With the objective to investigate:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need for additional knowledge to use the local formulary/guideline</td>
<td>Finding from the GP questionnaire; to further explore what type of knowledge that was needed in order to increase utility of the local formulary/guideline</td>
</tr>
<tr>
<td>Local formulary/guideline and influence on prescribing</td>
<td>If publication of the local formulary/guideline had altered GPs' prescribing habits and what impact it seemed to have in practice. This could give insight in how and how much the local formulary/guideline was used</td>
</tr>
<tr>
<td>Adhere to the local formulary/guideline</td>
<td>Self-reported adherence and perceived impact on prescribing that the local formulary/guideline had</td>
</tr>
<tr>
<td>Did you have any influence in developing the formulary?</td>
<td>Whether the GP was involved in the development of the formulary</td>
</tr>
<tr>
<td>Desire for more influence on formulary/guideline development</td>
<td>Whether GPs felt they had an opportunity to be involved if they so wished</td>
</tr>
<tr>
<td>Participation in PCT initiatives</td>
<td>To assess the knowledge of the GPs of the PCT prescribing agenda and their involvement in those GP's perceptions of these</td>
</tr>
<tr>
<td>Reading of the PCT prescribing newsletter</td>
<td>Whether the newsletter was an efficient way for PCT to advertise prescribing initiatives</td>
</tr>
<tr>
<td>Evidence of prescribing issues in journals and how the PCT newsletter compares</td>
<td>If and if so from what journals GPs collected evidence</td>
</tr>
<tr>
<td>Contact with PCT advisors</td>
<td>The level of contact the interviewee had with the PCT prescribing team and GPs appreciation of the PAs</td>
</tr>
<tr>
<td>Policy influence</td>
<td>GPs' perception of how much influence they had on shaping prescribing policy; if they felt that they had an opportunity to affect prescribing in desired direction</td>
</tr>
<tr>
<td>Controlled or restricted prescribing</td>
<td>If GPs felt restricted in their prescribing and if so, by whom</td>
</tr>
<tr>
<td></td>
<td>Whether all GPs felt the same way</td>
</tr>
</tbody>
</table>
6.2.2 Piloting the interview
The interview schedule was piloted in a South London PCT on two GPs and two stakeholders. The aim of the pilot interviews was to ensure the interview questions were clear and well understood by the interviewee and that they captured the issues for enquiry as intended.

6.2.3 Recruitment of sample
The invitations to participate in the interviews were posted out to all GPs registered in PCT1 and PCT2 at the time, in total 271 (Appendix V). The sampling strategy was partly self-selected and partly purposive to further the aim of a wide range of views. Recruitment methods varied between the GPs and the stakeholders as the two groups included a different number of potential recruits. GPs were initially recruited by an invitation letter sent out all GPs in both PCTs. Stakeholders from PCT1 and PCT2, who were few in number and also known to the researcher, were invited by phone. Stakeholders from other PCTs within the HA, HA personnel working with PCT prescribing issues and the two hospital pharmacists were invited by phone using snowball sampling. The following considerations were taken when recruiting the GP and stakeholder sample:

- To recruit GPs with different nationalities
- To recruit GPs working in teaching practices
- To recruit both sexes of GPs
- To recruit GPs with and without missions in the local PCT
- To recruit an even distribution of participants from PCT1 and PCT2
- To recruit the whole PCT prescribing team from PCT1 and PCT2
- To recruit representatives from prescribing teams in other PCTs within the local HA
- To recruit representatives working with Primary Care Prescribing in London HAs

The initial invitation letter to recruit GPs did not generate satisfactory response and a new recruitment approach was employed. Those who responded to the invitation letter that they did not want to participate were not further approached. The researcher contacted a set of GPs based on their ethnicity and whether they worked in a teaching practice or not. GPs from PCT1 were targeted with another letter of invitation, as there
was lower representation of PCT1 compared with PCT2. Both genders were sought in the GPs sample.

6.2.4 Interviewing procedures

The participants were interviewed face-to-face in their normal work setting at their convenience. The interviews were recorded on a Mini-Disc upon receipt of consent from the interviewee. Recordings made verbatim-transcription possible and provided full data for analysis. Issues of interest to the respondents, such as financial incentives were given increased recognition in the interviews.

6.2.5 Reasons for participation in the interviews

It proved useful to ask GPs why they took part in the interview to gain insight into what made them participate. By knowing GPs reasons for participation the PCTs could draw on these qualities to attract GPs’ attention. Therefore, all GPs who participated in the interviews were asked why they decided to do so.
6.3 RESULTS

6.3.1 Pilot interviews
The four pilot interviews did not result in any changes to the interview schedule. The purpose of the pilot interviews was to validate the interview schedule and as the pilot sample came from outside the study area these interviews were not included in the presented analysis.

6.3.2 The sample
Although initial response to the invitations was low, the response in PCT2 was satisfactory (11). GPs in PCT1 were followed up with another letter of invitation and by phone calls; another six interviewees were recruited by the latter method and four of these had commitments in local drug committees. It could therefore be assumed that these GPs were easier to persuade to participate. No alternative recruitment method was needed for the stakeholders as they all agreed to participation. In total, 37 interviews were undertaken (table 6.3).

<table>
<thead>
<tr>
<th>Sample professions</th>
<th>PCT1</th>
<th>PCT2</th>
<th>'Other' PCTs</th>
<th>Nationality of GP</th>
<th>Working in teaching practice</th>
<th>Gender of GP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UK</td>
<td>Non-UK</td>
<td>Yes</td>
<td>No</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>GPs</td>
<td>9</td>
<td>11</td>
<td>14</td>
<td>6</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>PCT pharmacists*</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HA personnel*</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Principal hospital pharmacists*</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>15</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Stakeholder = SH

The interviews took place between July and November 2002 at the interviewees' place of work and time of convenience. The interviews lasted between a quarter of an hour and three-quarters of an hour. All participants consented to the interview procedures.

6.3.3 Preparation of data for analysis
The 37 interviews were transcribed verbatim using the software package ViaVoice Pro Release 8 for Windows. The principal investigator (which was also the interviewer) listened to the recordings and dictated the interview into this software. For purposes of quality assurance the interviews were listened to again and initial dictating errors were
corrected in the transcribed document. A fellow researcher listened to 10% of the interviews and compared it with the transcript. Corrections were few and were discussed and agreed upon.

6.3.4 Analysis and presentation of the interviews
The software QSR NVivo version 1.3 was used to code the 37 interviews. The transcripts were coded by reading through and allocating quotes to the emerging codes. In total, 21 primary codes were formed and their labels and contents are described in table 6.4. Two fellow researchers assessed the main researcher’s primary coding and, in cases of discrepancy, full original transcripts were referred to before a final judgement on coding was made.

The analysis was divided into three stages; primary, secondary and tertiary as described in figure 6.2. This multi-stage analysis sought to increase credibility of interpretation of the contents of the codes as well as making comparisons between groups within the interview population more robust. The entire analysis was concerned with factual issues rather than ways of expressing the issues i.e. what was said rather than how it was said. All transcripts were analysed in the same manner. The analytical approach had elements of deduction; the interview schedule provided a framework for the primary codes in the primary stage. However, in a strictly deductive approach, codes are specified prior to the analysis. Later stages in the analysis took an inductive approach when the primary codes were themed (secondary stage) and these themes were contrasted between interviewees (tertiary stage). A grounded approach was taken: mainly inductive approach and the evolution of prompts into questions.
Comparing perceptions of prescribing of GPs and stakeholders: Results

**Primary analysis**
Twenty-one codes [the primary codes] emerged from the transcripts and described the data for meaning and as such formed an exploratory step in the interview analysis. Each of the primary codes was investigated in separation and sub-codes within each code were identified. Sub-codes were then described and illustrated by quotes to give the range of issues within each primary code. This exercise helped in generating further explanations of the interview topics. Procedures for quality assurance and consistency of interpretations were the same as with the initial coding described above.

The process involved structuring and reducing a large amount of data

**Secondary analysis**
The 21 codes from the primary analysis were used as a starting point for the secondary analysis in which 4 themes were generated: influences on prescribing; the PCT organisation; local formularies and incentive schemes; and commercial entities in primary care. This procedure was taken in order to expand thinking and make links between the themes that were identified in the primary analysis.

Themes provided coherent data that could be analysed and interpreted for deeper meaning

**Tertiary analysis**
The secondary analysis was re-iterated in the tertiary analysis and comparisons between GPs and stakeholders were made on each of the four themes. Implications of the findings and recommendations to the PCTs were made on what was considered pertinent issues.

In every stage, views from GPs and stakeholders were analysed according to the same process. At a later stage GPs’ and stakeholders’ views were contrasted in order to present potential barriers and implications, and to make recommendations for prescribing management.

Figure 6.2 Structure and purpose of steps of analysis of interviews

The iterative analysis process served to validate each previous step in the process. The analysis was spread out over one year and the researcher’s interpretations were up for scrutiny at each stage. The primary analysis involved coding the transcripts and reducing the amount of data. The initial codes were interpreted and grouped in the secondary analysis. In the tertiary analysis information from the secondary analysis was condensed and pertinent issues were presented.
Comparing perceptions of prescribing of GPs and stakeholders: Results

The findings from the tertiary analysis are reported in this thesis and quotes illustrate typical as well as uncommon responses in order to present the range of opinions that were present.
Comparing perceptions of prescribing of GPs and stakeholders: Results

Table 6.4 Code label and content of the 21 primary codes

<table>
<thead>
<tr>
<th>Code label</th>
<th>Responders</th>
<th>The code contained information on:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire for influence</td>
<td>GP and SH*</td>
<td>Whether the respondent would like to have more influence on prescribing</td>
</tr>
<tr>
<td>Financial incentives</td>
<td>GP and SH</td>
<td>General opinions about financial incentives, and how they were perceived, opinions on whether they should exist or not, what was achieved with the financial incentives and whether the sum of reward money was important</td>
</tr>
<tr>
<td>Future interventions</td>
<td>GP and SH</td>
<td>Opinions future prescribing activities; how they may change, and general ideas and opinions from GPs and SH to help in shaping future interventions</td>
</tr>
<tr>
<td>Good intervention</td>
<td>GP and SH</td>
<td>What a successful intervention comprised in the view of the respondents; how it should be set up and run</td>
</tr>
<tr>
<td>Feedback</td>
<td>GP and SH</td>
<td>Whether the respondent received or gave any feedback to GPs or PCT organisations</td>
</tr>
<tr>
<td>Guidelines and formulary: role and usage</td>
<td>GP and SH</td>
<td>Opinions of guidelines and formularies and how they were regarded in terms of importance to prescribing, what role these guidance should have, how formularies and guidelines compared and which one was favoured</td>
</tr>
<tr>
<td>Interface issues</td>
<td>GP and SH</td>
<td>Interface between primary and secondary care relating to prescribing</td>
</tr>
<tr>
<td>Local initiatives and implementation</td>
<td>GP and SH</td>
<td>Local prescribing activities in the PCT: what prescribing activities were implemented, how and information on the running of the initiatives</td>
</tr>
<tr>
<td>Local success and barriers</td>
<td>GP and SH</td>
<td>What the success and barriers were to the localities activities</td>
</tr>
<tr>
<td>National initiatives and implementation</td>
<td>GP and SH</td>
<td>What Governmental prescribing initiatives were known to the respondent</td>
</tr>
<tr>
<td>National success and barriers</td>
<td>GP and SH</td>
<td>What the success or failure of the Government initiatives were including facilitators to success</td>
</tr>
<tr>
<td>PCT role</td>
<td>GP and SH</td>
<td>The role of the PCT in influencing prescribing, what role they should take and suggestions of strategies to be successful in their role</td>
</tr>
<tr>
<td>Top 5</td>
<td>GP and SH</td>
<td>The top 5 issues that influenced GPs prescribing. The SH were asked what they thought were the top 5 issues that influenced GPs prescribing</td>
</tr>
<tr>
<td>HA responsibility</td>
<td>SH</td>
<td>HAs responsibility in regard to primary care prescribing (question was posed to stakeholders from the HA only)</td>
</tr>
<tr>
<td>Additional knowledge</td>
<td>GP</td>
<td>Any additional knowledge needed by the GPs to use the formulary to the full (a follow up question from the questionnaire question where more than one third said that they needed additional knowledge)</td>
</tr>
<tr>
<td>Adherence and impact on prescribing</td>
<td>GP</td>
<td>The impact and influence of the local guidelines on their prescribing and whether they adhered</td>
</tr>
<tr>
<td>Guideline involvement</td>
<td>GP</td>
<td>GPs involvement in the development of the guideline, their desire for involvement and reasons why, general interest in prescribing issues driven by the PCT</td>
</tr>
<tr>
<td>Journals and PCT newsletter</td>
<td>GP</td>
<td>What journals GPs referred to for evidence and how much influence and reliance they attributed to the local PCT prescribing newsletter</td>
</tr>
<tr>
<td>Policy influence</td>
<td>GP</td>
<td>How much the GPs felt they could influence prescribing policy locally and nationally, their desire for doing so and reasons why</td>
</tr>
<tr>
<td>Prescribing controlled</td>
<td>GP</td>
<td>Whether the GPs felt controlled or restricted in their prescribing by national or local bodies and how they felt about this</td>
</tr>
<tr>
<td>PCT participation and contact</td>
<td>GP</td>
<td>How much the GPs participated in local initiatives, and the level of contact they had with the PCT</td>
</tr>
</tbody>
</table>

*SH=Stakeholder
Comparing perceptions of prescribing of GPs and stakeholders: Results

Quotes were labelled as GP or SH (stakeholder) the identity number, the PCT and the gender. An example would look like (GP9;PCT2;M) or (SH27;PCT1;F). In cases where the stakeholder did not belong any of the study PCTs or not to a PCT at all this was marked with PCTX or simply leaving out the PCT identity; (SH34;PCTX;F) or (SH3;M).

6.3.5 Reasons for participation in the interviews

A response was received from all GPs that were asked face-to-face why they had decided to participate in the interview. Unfortunately, there were two occasions of technical problems with the mini-disc recorder why these doctors' reasons were missed out in the analysis. Ten of the thirteen that were contacted via mail responded; one doctor had quit and two doctors did not respond after a reminder had been sent out. Responses were coded in QSR NVivo version 1.3.

A majority of GPs mentioned that investigations such as through these interviews would advance the development in health care. The motivations could be structured around three themes; education; interest; or obligation to participate.

Education

Some GPs saw participation as an opportunity for personal education or feedback whereas others thought the PCTs could benefit from this type of knowledge which in turn would benefit the GPs. The motivations were expressed in different ways; as specific individual objectives (to improve their own prescribing), to holistic motivations (inform health care policy for the benefit of patients). One GP seemed to have misunderstood the real purpose of the interview and had hoped to receive a confirmation from the researcher that he was ‘doing the right thing’ in terms of prescribing. No such objectives were included in the agenda for the interview.

“GP information helps play a part to up-date or improve the practice. Thought it was educationally challenging. Practice prescribing patterns (for you to know)”
GP6;PCT2;M (letter)

“I felt that this could help a better understanding of GPs’ prescription habits, which will help formation of PCTs policy to then help GPs individually for better quality treatments of patients.”
GP26;PCT2;M (letter)

“I am quite interested in the situation where it might improve the outlook of the whole thing really, it might…, maybe you come back to me and say ‘some of you have to be corrected’, so it is like feedback
Comparing perceptions of prescribing of GPs and stakeholders: Results

for me, and also my feedback on others to see whether I’m telling the right thing or not. I just wanted to know about what I am doing is right or not, that is the main reason that I agreed.”

GP4;PCT1;M (tape)

Interest

Participation in the interview was sometimes driven by a personal interest in prescribing issues or a general interest in improvement of health care. Many of these GPs also held additional posts within the PCT. If the interview had concerned another topic than prescribing maybe these GPs would not have taken part.

“I am interested in effective evidence based prescribing. I am also interested in consistent treatment of patients between doctors and I hope this research may advance this aim.”

GP25;PCT1;M (letter)

“Interested in therapeutics, member of the sub-committee of prescribing, interested in peoples' behaviour around choosing drugs to prescribe, I run a course: MD in Prescribing as part of a diploma at [School of Medicine]

GP1;PCT1;M (tape)

“Long interest in rational prescribing: good teaching of clinical pharmacology as student. Later involved in WHO Essential Drugs Programme and wrote a national formulary for Bhutan. Now involved in PCT and so concerns to balance clinical excellence with economical prescribing.”

GP9;PCT2;M (letter)

Obligation

Other GPs were driven by a feeling of obligation to take part; many of these were women. In contrast to GPs who were motivated by personal ‘interest’, these GPs thought that research was an important function for changing health care and achieving increased quality of care. Their feeling of obligation was in some cases linked to the fact that they had posts with the PCTs or on prescribing committees. They hoped they could contribute with knowledge that was important for development within the NHS. It could be proposed that these GPs would be more likely to participate in another study with a different topic than the GPs who were motivated by interest in prescribing.

“Research is important and we ought to do that. It is my responsibility as being on the Board, and as a GP as well, to participate in such initiatives”

GP2;PCT1;F (tape)

“A rash moment! (laugh) No, I think it is important to gain views of professionals in order to make changes and to look at policies. Bright ideas taken without consultation don’t necessarily match what is really going on. To some extent I am quite happy to participate in this sort of interview, within sort of certain physical constraints, I can’t do it every day but…”

GP11;PCT1;M (tape)

“To help academic departments to obtain facts. GP information helps to play a part, to up-date or improve the practice”
Comparing perceptions of prescribing of GPs and stakeholders: Results

GP6; PCT2; M (letter)

"Because I would feel bad if I didn't, as I am responsible for prescribing and I am affiliated with pharmacy and have long term links with them."

GP5; PCT2; F (tape)
6.3.6 Factors influencing prescribing

This section presents GPs' and stakeholders' views on factors that influence primary care prescribing and the evidence around implementation of new prescribing initiatives. The views of the two respondent groups are contrasted throughout the section. While GPs gave details about how their prescribing was influenced and what activities they were involved in, stakeholders focused on how to implement change and overcome barriers to change. In subsequent sections some of these influencing factors are discussed in more detail and depth: the PCT organisation and pharmaceutical advisors; local formularies and prescribing incentive schemes; and commercial influences. Implications and recommendations to each of these sections are presented in sections 6.4.3 to 6.4.6.

Interviewees were asked to mention five factors they thought had the most influence on their own prescribing, or in the case of the stakeholders, that they thought had the most influence on GPs prescribing. Table 6.5 lists all factors that were mentioned by either GPs or stakeholders and showed that similar issues were discussed by both groups. In some cases the two respondent groups attached different importance to different factors as illustrated by the quotes in the table. Some respondents purely listed out five influencing factors which is why some quotes were short and lack further explanation.
Comparing perceptions of prescribing of GPs and stakeholders: Results

<table>
<thead>
<tr>
<th>Type of influence</th>
<th>Quotes from GPs</th>
<th>Quotes from stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNF</td>
<td>&quot;The BNF, as opposed to MIMS is a brilliant bit of work&quot; (GP9;PCT2;M)</td>
<td>&quot;The literature that they have available to them so, if they pick the MIMS or the BNF...&quot; (SH29;PCT2;F)</td>
</tr>
<tr>
<td>Cost of drug</td>
<td>&quot;Cost would probably be quite low down the list&quot; (GP10;PCT1;F)</td>
<td>&quot;There is probably somewhere something in there about cost but I'm not as convinced it is as important as it was three or four years ago because costs are just so phenomenal anyway&quot; (SH33;P)</td>
</tr>
<tr>
<td>Drug representatives</td>
<td>&quot;Sometimes it can be you meet the rep and that you want to try his drug for that particular few days, so that has an influence&quot; (GP26;PCT2;M)</td>
<td>&quot;Pharmaceutical industry undoubtedly and maybe it just slips subliminally having a page with a drug name on it&quot; (SH27;PCT1;F)</td>
</tr>
<tr>
<td>Evidence Based Medicine</td>
<td>&quot;I always take some information from Bandolier and Cochrane Library but not many people do that&quot; (GP7;PCT1;M)</td>
<td>&quot;I think sometimes time, err... and there are also awareness of what is evidence based good prescribing&quot; (SH22;PCT2;F)</td>
</tr>
<tr>
<td>Education; current</td>
<td>&quot;Educational events or meetings...&quot; (GP15;PCT2;F)</td>
<td>&quot;The training that might support that, that would influence their prescribing.&quot; (SH17;F)</td>
</tr>
<tr>
<td>Education; former</td>
<td>&quot;I think, who you trained with before you became a GP is very important, so if you worked with a team of doctors who were very keen on a certain treatment for a particular condition you obviously then know about that treatment and you are more likely to feel comfortable with using it&quot; (GP13;PCT1;M)</td>
<td>&quot;Things like their training, undergrad and Postgrad&quot; (SH31;PCTX;F)</td>
</tr>
<tr>
<td>Familiarity</td>
<td>&quot;A big thing is familiarity, if you are familiar with that drug you are more likely to prescribe it than if you are not&quot; (GP13;PCT1;M)</td>
<td>&quot;Habit or familiarity&quot; (SH30;F)</td>
</tr>
<tr>
<td>GP demographics</td>
<td>&quot;Education-anything that I have, you know, new education and probably linked to that to a certain extent my age&quot; (GP10;PCT1;F)</td>
<td>&quot;I think it is very, very different with GPs; but older ones probably stick with what they know whereas the newer ones are much more likely to look at evidence...&quot; (SH19;PCT2;F)</td>
</tr>
<tr>
<td>Hospital prescribing</td>
<td>&quot;I probably am not very good at questioning hospital prescriptions and I think sometimes just about ever patient seems to come out from the hospital at the moment on a PPI or ranitidine and I think we ought to be querying this more&quot; (GP9;PCT2;M)</td>
<td>&quot;What comes out of the hospital; what the doctors use in the hospital&quot; (SH20;PCT1;F)</td>
</tr>
<tr>
<td>Incentive Schemes</td>
<td>&quot;The authorities believe what they are doing and therefore if there is a push that such and such is a good idea I am inclined to adopt that which is not a very, which is not an intellectual strength but it does get me the incentive scheme money&quot; (GP9;PCT2;M)</td>
<td>&quot;Financial bonus is significant but potentially lower than perhaps the other [factors]&quot; (SH17;F)</td>
</tr>
<tr>
<td>Journals</td>
<td>&quot;Peer review articles...God! that is all I base it on&quot; (GP16;PCT1;M)</td>
<td>&quot;What they read in the BMJ, but that might be wishful thinking in some respects&quot; (SH31;PCTX;F)</td>
</tr>
<tr>
<td>Local formulary/ guideline</td>
<td>&quot;The NICE guidelines would come down at the bottom there because although I know they are important on certain drugs they do not affect my prescribing as the local guidelines do&quot; (GP25;PCT1;M)</td>
<td>&quot;NSF and NICE have to be in the running now and local guidance that follows from them. Some of those might be wish-list rather than facts (laugh)&quot; (SH31;PCTX;F)</td>
</tr>
</tbody>
</table>
As shown in table 6.5, both groups mentioned factors such as former education, prescribing activities, written material, individual characteristics of the GP, practical issues such as previous experience of a drug, national and local guidance, and peers.

In a few cases there was a discrepancy between the factors mentioned by the prescribers and those mentioned by the stakeholders. Interestingly, the stakeholders did not mention community pharmacists as an influence whereas one GP did. Only one GP thought that PAs had an influence on GP prescribing whereas many stakeholders mentioned PAs amongst the top five influencing factors; perhaps the below quote explained why this was so.

“I think the work of our team; I would have to say number 1, wouldn’t I? …”

(SH35;PCTX;F)

While stakeholders mentioned ‘time’ as an influence, none of the GPs did so. Possibly, doctors did not want to admit to that their clinical practice could be influenced by
something as 'trivial' as time. One GP admitted that writing a prescription could be a quicker way to 'get-rid-of' a patient, and could be used especially when working as a locum GP. This factor was however not mentioned amongst the top five influences.

"I may feel that, yes, you will pay me for not prescribing so much amoxicillin for sore throats but I will actually cope with my work load more quickly by writing that prescription and getting the patient out of the door rather than by giving them health education, because this is not my own practice" (GP9;PCT2;M)

Journals were perceived differently by stakeholders and the GPs (table 6.5). The quoted GP may have been unique in his practise by basing all prescribing on evidence from journals but even so, the stakeholders should recognise that there are different types of prescribers in their PCT. The below quotes from GPs in the same PCT is an example of how vastly different local formularies can be perceived as means for influence.

"Not the [local] formulary I have to say..." (GP13;PCT1;M)

"The NICE guidelines would come down at the bottom there because although I know they are important on certain drugs they do not affect my prescribing as the local guidelines do" (GP25;PCT1;M)

Most GPs did not think that cost of drugs was highly influential on their prescribing. Others said that cost was influential as long as it did not have any adverse clinical consequences.

"Cost is the fifth; I try to provide cost-effectiveness..." (GP2;PCT1;F)

"I try to produce, to do rational prescribing and economic prescribing but not at the expense of what is clinically rational" (GP5;PCT2;F)

Past experiences, familiarity and habits were mentioned by many GPs. Former education and individual lecturers were important influences on GPs. The WHO (1994) said it was essential to have an appropriate prescribing pattern when leaving medical school as much improvement is not to be expected after graduation.

"Clinical pharmacology at [XX] hospital, professor [XX] he was a huge influence" (GP9;PCT2;M)
"I am still a little bit influenced by what I have learnt as a young doctor, a little bit in certain things so there is a certain ear drop that I prescribe which is effective and I was taught to use it to by my trainer twenty-five years ago and I am still using it, there is no problem with that, but it is interesting that I still do it that"

(GP14;PCT2;F)

Like stakeholders, GPs thought that prescribing patterns were linked to personal characteristics and age.

"My education in terms of just the person and doctor I ended up being"

(GP25;PCT1;M)

The PCTs held educational activities for GPs and other practice staff (section 5.3.1). Some PCTs provided PGA hours for attendance to incentivise GPs to come to sessions. The PAs also held many meetings in which prescribing issues were discussed.

"When we hold meetings we always have PGA approval so they get their post graduate hours for coming along, so that is an incentive"

(SH21;PCT2;F)

"Where a doctor comes out of hospital and decides they want to work in general practice and they are at sort of a registrar level and they do vocational training in primary care and they go to teaching practices locally so [our PA] does some sort of training and sessions with them"

(SH22;PCT2;F)

"Training to GPs, last year we provided some multi-disciplinary training for GPs and pharmacists"

(SH34;PCTX;F)

Communication was thought to be essential for all prescribing initiatives; when issuing prescribing initiatives such as the prescribing incentive scheme or launching a formulary, information must be part of the implementation. Both GPs and stakeholders specifically asked for feedback from the ‘other side’ and it was clear that both GPs and stakeholders were unhappy with the efforts from the ‘other side’. A lack of understanding and complaints prevailed on both sides (table 6.6). Some GPs thought the feedback process was of little use to them. Stakeholders and GPs thought that prescribing interventions were ways of giving feedback while both complained that feedback was always negative. The original quotes have been shortened to short sentences for space-saving purposes while retaining the meaning. The table should be read across, as statements are matched between GPs and stakeholders.
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<table>
<thead>
<tr>
<th>Table 6.6 Comparative views on feedback from GPs and stakeholders</th>
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<tbody>
<tr>
<td><strong>GPs</strong></td>
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<tr>
<td>PCTs will not take note of our feedback</td>
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<tr>
<td>GPs with post in the PCT have many opportunities for feedback</td>
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<tr>
<td>We need positive feedback</td>
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<tr>
<td>We give feedback face-to-face to PAs when they visit the practice, we give written feedback to secondary care</td>
</tr>
<tr>
<td>Feedback is not given unless the PCT approach us in person for it</td>
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<tr>
<td>You don't miss much by not being involved in the feedback-process</td>
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<tr>
<td>We give feedback indirectly via audits</td>
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<tr>
<td>Practices could benefit financially in giving feedback</td>
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<tr>
<td>There are opportunity to give feedback on policy in Forum meetings</td>
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Different GPs reported both a lack of information and information-overload implying that they didn't feel they received the right amount, or perhaps kind, of information.

"I think you know there is actually a shortage of information for those who wish to prescribe as rationally and economically as possible while not being economical by not prescribing, but by being economical by prescribing the most appropriate and most cost effective medication, and I think that information is often quite hard to come by; at least difficult for commercial reasons, for the PCT actually to give us that information"  
(GP9;PCT2;M)

"They send bundles and bundles and we don't have time to read those so once, say every 6 months if they can communicate with us verbally or come and see us you know in one of our meetings that should be all right"  
(GP6;PCT2;M)

Stakeholders recognised there was information overload but defended their approach to send out material to GPs for reference purposes.

"I think one of the other difficulties is that we know that paper things do not always get through to people but obviously I think it is still important to send them because if somebody rings you or they email you, you can then refer them to something that they have already had"  
(SH22;PCT2;F)

"Written information is always...is always going to be difficult to kind of reach the target audience and we really don't know how effective and how many people will actually read and actually action it"  
(SH27;PCT1;F)

No GP or stakeholder mentioned the local PCT newsletter in the top five influences but many GPs said they read it. GPs liked the local newsletter because it was modified to
Comparing perceptions of prescribing of GPs and stakeholders: Results

the locality and said it was a useful device for communication. Responses from GPs varied whether prescribing advice in the local newsletter was trusted or not. A number of quotes are presented in order to demonstrate the range of responses:

“Oh yes, that is something I would not miss! I would follow more of our ones local ones because our local one are picked up from national but tweaked in a way to suit us, so we don’t need to bother about what is happening in the other journals”

(GP7;PCT1;M)

“I do and that this very useful! And the medicine section in the PCT newsletter I read that. I do have confidence in the competence of the team ... I would be happy to go with that”

(GP14;PCT2;F)

“I would take more credence from the BMJ than from the local directive”

(GP10;PCT1;F)

“I think that is why things they put there [the local Newsletter] I do not always follow it blindly, because we don’t know the person who has written it. Anybody could write that. They are useful but we need to check against that. Quite a few times I have realised that things that have been written have not always been right”

(GP26;PCT2;M)

Evidence that were pooled from many sources seemed to suit GPs as they did not have the time, interest or knowledge to read and evaluate the original source of evidence.

“Most of us do not have the time to access the original evidence and we probably don’t have the skills to do so either...”

(GP9;PCT2;M)

“I don’t have time to read the complexity of a study so I generally read review articles; that to me is much more useful, much more interesting, much more clinically appropriate than looking at a paper which says “Is salbutamol better than terbutalin as a beta agonist?”

(GP13;PCT1;M)

Reported problems around prescribing at the primary and secondary care interface were of political and litigious character. The NHS was accused for directing the drug costs over to primary care and blamed for not providing legal cover for GPs continuing to prescribe what had been initiated in secondary care. GPs thought hospital doctors prescribed less generically and that young hospital doctors needed ‘looking after’. By having common agreements around preferred drug choices and to streamline prescribing via authorities improvements across the interface could be achieved:

“I would actually have liked to have seen, when the guidelines were coming out, a little bit more narrowing of the drugs because otherwise I feel we end up hospital led or not having enough influence on the hospital led prescribing and I think that it hasn’t been easy and that any of the positions I have been I would prefer to CEG [Clinical Effectiveness Group] or the PCT to influence that very much which is largely a person power issue”

(GP5;PCT2;F)
GPs did not mention that prescribing of specialist drugs would potentially require skills that were lacking in primary care. This argument was also lacking in a study by Horne et al. (2001). In this study, hospital doctors said that GPs should allow the monitoring of the patient to take place elsewhere and just issue the prescription. Stakeholders were aware of the interface problems and described ways in which the PCT was working to overcome these; by getting primary and secondary care to work according to a common prescribing formulary, or by having a pharmacist that works both in primary and secondary care. Not all stakeholders were specific in how this work would be undertaken.

“Our drug committee has just recently combined, so primary and secondary care we have got one drugs committee as of September and I think more and more Trusts are beginning to do that”
(SH32;PCT1;F)

“We try and work quite loosely with secondary care..., and that’s part of my job to try and influence what they do because obviously they have a big influence on what is prescribed in primary care so if we can, if we can influence what they’re doing hopefully those good habits we be transferred out to primary care”
(SH21;PCT2;F)

A stakeholder with links to secondary care felt that the gap between the primary and secondary care prescribing was at times used by doctors as an excuse for not sorting out their own problems.

“I didn’t want to get into this tribalism [between primary and secondary care] because I think too often that is used as an excuse not to do anything”
(SH3;M)

Lack of resource was an important issue for poor uptake of new initiatives. GPs responded that non-participation was due to the bulk of the daily workload. A too heavy workload is serious because it can hinder improvement and create isolation as pointed out by one GP.

“Yes, there are plenty of barriers: work-load. Reduce workload! Get more GPs and more staff in!”
(GP16;PCT1;M)

“I think there are probably issues of isolation. Probably just a lot to do with workload and that it is just ‘so much’ that you can do”
(GP18;PCT2;M)

Stakeholders agreed that workload within primary care was large and that it could be a barrier when implementing new initiatives. The fact that therapies had become increasingly complex would also contribute to the general increase of GPs workload.
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“We are competing in terms of getting across messages of prescribing. Competing against the whole, I think everybody in primary care just feel over laden, but I think that is probably it is fair to say that everyone in the health service is feeling sort of over laden really”
(Sh35;PCTX;F)

“Just too much, there are too many targets, there is too much, it’s too varied, I think, for GPs particularly. The number of drugs on the scene has increased dramatically and they’re still expected to know a general amount about all of them and it is just too much pressure, really, it’s too much for them to take in”
(Sh30;F)

GPs complained that there was always an initiative running and no ‘quieter period’. This was also recognised by stakeholders who explained that there were too many targets and that Government imperatives were turned out at a too fast of a speed and that the PCT had to prioritise which activities to implement.

“Our practice manager is always constantly trying to keep up what is due now this year this month... so I think there is a sense in which it just keeps us on a bit of a treadmill”
(GP14;PCT2;F)

“The other thing I sort of mentioned earlier was the fact their practices are if you’d like, they are almost suffering from intervention overload. You know, everyone is making interventions with them about so many things and within the NHS Plan it is like ratcheted up such a point where they kind of they almost have this some sort of glazed look when you talk to them sometimes the just say “God we’ve got to do something else” which is really unfortunate.”
(SH22;PCT2;F)

“Fifty or how many NICE things there are now? I know they are not all to do with primary care, and so you can’t make as many changes as you want to, so you have to really cherry pick them, prioritise them”
(SH22;PCT2;F)

GPs said that if they did not think the initiative deserved involvement they would not take part. This was even more so when advice was external. GPs described their profession as ‘conservative’ and ‘stuck in their ways’, which they said was especially true for older doctors. Stakeholders agreed to this and meant that a general lack of interest in the job could explain why new activities were not enacted upon.

“The barrier is that if I have always prescribed such and such, then I may need quite a lot convincing not to do so or to alter my practice... GPs are always a bit paranoid about people coming in from outside and telling them what they ought to be doing...I think the barriers are probably that doctors are enormously conservative and that policy changes quite quickly”
(GP9;PCT2;M)

“The people you are actually really trying to reach they just don’t go because they are not interested in because they are not really interested in medicine”
(GP23;PCT2;F)

“There are recruitment problems but also because there are old GPs, older as in age and pretty much stuck in their ways, reluctant to change it is only the new wave of GP that are coming through and listening to this change”
(GP16;PCT1;M)
"GPs that are 55 and above, not far off retirement, they are stuck in their ways, they feel that their patients like how they have been treated and quite often they have got a few generations of patients so, I think, you know, the new way of working doesn’t fit in with their way and also single-handed practices don’t again have the space maybe or time to devote."

(SH28;PCTX;F)

Stakeholders recognised that GPs were independent and were free to opt out of initiatives, insinuating that this may not be ideal but that such was the tradition of general practice.

"They always have that choice in that profession, they don’t have to do what we say it is up to them"

(SH19;PCT2;F)

"What you have in primary care is a lack of control, there really is a lack of control and in hospital you know we [in secondary care] have greater control because we have more pharmacists and we are closer to the point where the prescriber actually prescribes"

(SH37;M)

According to stakeholders, barriers to implementation varied between practices and were reflected in GP demographics and practice structures. More knowledge of what contributed to differences between practices was demanded:

"[there are some] very good practices and there are some really, really bad ones any think that it just doesn’t work something has to be done about it so it is just a case of trying to get a bit more clarity of rules and, and sort out what is happening between the good ones and the bad ones"

(SH29;PCT2;F)

"Smaller practices, single-handed practices, which don’t have necessarily has the support that they need in the practice to do simple things; systematic things which makes reviewing and following protocols and procedures that much harder"

(SH19;PCT2;F)

To get the ‘bad’ practices to catch up with the ‘good’ it was suggested that PAs should assess where the practice was not achieving and why this was so, making sure to look at issues other than prescribing. Perhaps was ‘bad’ prescribing just an expression of other problems within the practice as suggested by one GP:

"You don’t normally find practices where you have got horrendous prescribing and then everything else is hunky-dory"

(GP1;PCT1;M)

Speaking against providing extra support to needy practices, some stakeholders were unsure whether the PCT’s efforts were of any benefit. Some stakeholders expressed a slight resignation towards managing the prescribing agenda:
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"I still think there is an awful lot of really simple, well-what I would call, simple messages, evidence that is very clear and we still know is not being implemented in general practice...! Maybe we are tying to be a little bit too sophisticated about our messages and that we should be going to just for very simple information and repeating that in a number of different ways instead of being too much sort of a scattergun and trying to do lots and lots of different things. But there are so much information and so many things to look and how do you do it all?"

(SH27;PCTX;F)

Stakeholders found it difficult to implement new initiatives and felt they had to compete for GPs’ attention. Using several modes of communication was still not enough as described by one stakeholder:

It is very difficult to get messages across so you just have to try and use several different ways whether it is, you know an e-mail, a letter, GP forum and you will still have people I’m sure in six months, saying "What formulary? I didn’t know we had a formulary.”

(SH35;PCTX;F)

Practice visits were a popular approach amongst stakeholder to deliver messages to the GPs, although this method was to a large extent affected by people capacity.

"Try and go and visit them on a personal level to find out what their needs are or recommend to target specific areas"

(SH32;PCT1;F)

"I feel that we have probably fewer pharmacists that we probably need to do that job and effectively and as the workload increases generally then it is usually prescribing visits that get dropped off the end of the list"

(SH34;PCTX;F)

"It is really useful to be able to talk to the whole team and the difficulty is that you can’t do that in some practices, again you’ve only got 30 minutes so you have got to have a limited number of messages and they have got to be very succinct, you can’t make as many changes as perhaps [would be ideal]"

(SH22;PCT2;F)

Stakeholders came up with ideas of how to make initiatives happen; one PCT advisor suggested that the PCT should work with the industry or that new collaborations could be formed between the PCTs and the large pharmacy chains like Boots. Improving logistics in the practice and utilising other practice staff than GPs to collect data and work on initiatives could alleviate some of GPs’ workloads.

"Maybe if the PCTs can work with the industry for their benefit you know, if they actively seek out what the company is going to benefit them as well as the GPs maybe there will be more industry working. I don’t know...maybe you would have people like Boots paying for people to work in practice, I don’t know..."

(SH28;PCTX;F)
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"Good appointments system, you know, good practice managers staff they could work a bit more on their prescribing targets but you got to achieve that before you can, so we have a Primary Care Development Team and facilitators and we have clinical governance facilitators as well who work with them…"
(SH21;PCT2;F)

A lack of implementation strategy was reported by a stakeholder as a problem which was recognised by one GP. The respondents worked in different PCTs so the problem may be widespread.

"We… develop as we go along. (laughter) I think we are learning…The way we have worked is very ad hoc, we each work in our own way. I think we all do things in or own way but, you know I don’t think it is a bad way"
(SH28;PCTX;F)

"It is completely muddled! A complete mess! And when we get letters though and then you go to a meeting and you will get a letter about the same thing but which seems to say something completely different…It is all very random, very arbitrary"
(GP10;PCT1;F)
6.3.7 The PCT organisation and prescribing advisors

The aim of this section was to investigate the GPs' perceptions on and the role of the PCT and how they felt about the PAs advising on their prescribing. Stakeholders were asked their views on implementing the prescribing agenda and the obstacles they perceived.

6.3.7.1 GPs' views on the PCT organisation and prescribing advisors

The PCT organisation

Many GPs saw the PCTs as multi-functional organisations with regards to prescribing; administrative, political, and hands-on supportive and controlling. A few GPs felt that the main duty for the PCT was financial. Many GPs thought that the PCTs had an important administrative role and expected constant change in national priorities except for cost containment which would always remain.

"Financial probably. Financial input. To a certain amount education but I would say that their main influence is probably financial"
(GP10;PCT1;F)

"Well, I think at the moment it has to be the PCT that is the meeting point, err... because they are the central people that are having all the meetings and can invite all the stakeholders along and the have the kind of management time to organise these things that clinicians would not be able to do without some of the PCT people"
(GP15;PCT2;F)

"I think priorities will change and I mean the Government is always, and the PCT therefore, is always going to want to drive down costs, will always have new areas of priority"
(GP9;PCT2;M)

GPs expressed the financial role differently; that the PCT must ensure value for money or that the PCT was cost-cutting.

"The prescribing budget is huge; it is around £20 million, so the PCT has a responsibility to ensure that we are getting value for money from that huge amount...the PCT has a major public role and it can't simply leave individual prescribers to make their own decisions. It [the PCT] has to try to influence them, however against that there is a tension between that and the individual doctor's clinical responsibility to individual patients"
(GP2;PCT1;F)

"The PCT's role is to cut the cost. Remain in the NSF and NICE guidelines and prescribe you know with evidence based medicine"
(GP8;PCT2;M)

Many GPs felt that the PCT should have a supportive function in relation to GP practices. The hands-on role was described in terms of managing resources, influencing
Comparing perceptions of prescribing of GPs and stakeholders: Results

good quality prescribing, streamlining prescribing across the interface, implementing national guidelines, highlighting areas of improvement for individual practices and making sure to educate the GPs. They were seen as a middle-road between the Government and the practices and should support quality of prescribing programmes.

"I think that the PCT has a role in supporting and encouraging people to prescribe more when that seems to be required for improved health. I think in general our HA and our PCT have done that despite what must be pressures on them in terms of money... the PCT probably have struck the right balance in that way"

(GP14;PCT2;F)

"I believe this is the Government’s view that the PCT is close enough to the ground to be effective and is being given the power to actually get things done. The PCT’s role is between the wider NHS and the individual practitioners on the ground"

(GP9;PCT2;M)

"The role will be in to point out what things we are not doing right... sometimes you maybe not being doing something right and the PCT can point that out"

(GP4;PCT1;M)

Some GPs thought that PCTs should be more closely connected with practice; the grassroots, while others thought there was a connection between the PCT and the grassroots already.

"There were issues recently with the local audit that they asked for, which I think could have been better thought out....what they want to do may be difficult implementing, so they may still distant from grassroots"

(GP18;PCT2;M)

"There are visits from PAs to practices so again they are able to pick up grassroot-opinions and so on, so, yes, there is some interaction there certainly"

(GP9;PCT2;M)

GPs views were split whether the PCT should have a controlling function. The majority of GPs thought that the PCTs should assess GPs’ prescribing to drive quality of care as inappropriate prescribing was not uncommon. One GP acknowledged the difficulty in both controlling and supporting GPs.

"Almost by definition they need to check up, they need to get the details, they need to find where the problems lie. They should try and have some strategy for helping with practices. They shouldn’t just be data gathering"

(GP18;PCT2;M)

"There is a role of an overseeing authority, definitely. That is probably something that has been lacking in medicine during all times"

(GP13;PCT1;M)
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"The PCT needs to be involved to support GPs more than anything else. I don't think they need to sort of dictate. We don't need someone coming round in sort of every five minutes"
(GP24;PCT2;F)

"Whilst the PCG was simply a supporter it was easy. The PCT does have this dual role; it both supports primary care and commissions primary care and I don't know whether that works"
(GP11;PCT1;M)

Pharmaceutical advisors

The two most common points of contact between GPs and the PCT personnel were when the PCT arranged a meeting or when PAs visited the practices. Many GPs went to meetings or at least sent one representative from the practice. Not all interviewed GPs had received visits from PAs but even so there was a willingness to establish a relationship. PAs were regarded positively; yearly visits by the PAs seemed to be norm. A few GPs thought that practice visits were targeted towards less good prescribers. GPs who did not receive any visits often gave an explanation to why; either they met PAs in other situations or they were very newly established practices so that regular contact had not yet been set up.

"Just having a prescribing advisor is a huge advance over where we were 5 years ago. It makes a huge difference, I mean, [our PA] is fantastic and so was her predecessor... I think the PCTs attempts to advise and I think the whole relationship with the prescribing advisor is excellent... that is partly because in this area we have been under spending our budget compared to national, up to now, now that we are in the usual over spend situation then it may not be quite so rosy"
(GP2;PCT1;F)

"We discuss the problems we are facing with them, usually once or twice a year. They work on the prescribing incentive scheme and they help tell us how to deal with it and what are the problems we are facing and they listen. It is a very good communication between PCT and GPs"
(GP8;PCT2;M)

"I think that the reality is that practices that are seen to cause concern for one reason or the other will get the bruit of face-to-face contacts. The other practices will simply get communicated by letter. That is perfectly reasonable from the point of view of the PA and how to make best use of their time"
(GP11;PCT1;M)

GPs highlighted the tensions between professions in different ways. The knowledge and capacity of the PA was queried by one GP, yet this GP was satisfied with the help received from the PCT.

"I think the important thing for prescribing advisors is to be seen to have a knowledge and understanding of general practice"
(GP9;PCT2;F)
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"I think what they do in PCT1 is quite good but it depends on the quality of the people you have as advisers, ... if you have good people you can do a lot but the problem is that you know that not all PCTs have advisers." (GP1; PCT1; M)

"The one you call the prescribing advisor is not clinically trained, they are not doctors, so therefore we tell them the clinical problems that we are having, so they listen and suggest help... as far as in PCT2, my knowledge goes, I may be wrong; not all of them are pharmacists, no? There is only one person that looks at it here... I do not think that lady is a pharmacist. I may be wrong in that..." (GP8; PCT2; M)

GPs welcomed the new strategies for shared working with pharmacists other than PAs and thought that patient services could benefit from the new partnership which could also spare GPs’ time. Supplementary prescribing was seen as a way forward.

"Our local pharmacist from a really good pharmacy, and he is fantastic and he is really good and not that he tells me about drug rep stuff but if I speak to him he would advise me, he is very good and he is very, very helpful. So we use him quite a lot." (GP25; PCT1; M)

"Obviously Government initiatives will be important but I think things are working better together with pharmacists, local pharmacists will also be very influential. I really hope, I see huge advantages through repeat dispensing … monthly prescriptions it is a big burden on our practice issuing a prescription once a month checking the quantities so I think if pharmacists could have a bigger role there that could be really helpful." (GP2; PCT1; F)

One GP highlighted that PAs could support practices by helping doctors to cope with patient demand and to loosen up restrictions on prescribing.

"I think that the Pharmaceutical Advisors should be more supportive and should understand a bit more the problem GPs faces. Clinical problems and organisational as well as clinical. There is a demand; demand of the patient. Nobody thinks about the demand. They simple think cut down this, this, this, this. There are too many unnecessary demands to prescribing. When the patient comes and asks; then do you fight with them? What do you do?" (GP8; PCT2; M)

Prescribing control

GPs were asked whether they felt their prescribing was controlled or restricted by authorities in order to indicate whether the Government had gone ‘too far’ in decreasing the autonomy of GPs. In order to illustrate how views varied a diagram was drawn up exemplifying GPs’ thoughts (Figure 6.3). Whilst no quantitative measure was attached, quotes to the right represented a greater feeling of restriction and control.

Some GPs felt that they were not being controlled or restricted at all in their prescribing whereas others thought they were being controlled. Some GPs thought that control was
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exerted in the interest of good quality of care while others said that they felt restricted by trying to keep to budget and that this could create conflict between GPs and patients. One GP said that the prescribing budget was not considered at all if the patient needed the prescription. Other GPs said they felt restricted within certain prescribing areas.

Figure 6.3 GPs feelings of prescribing control

Barriers to change

GPs indicated that PCTs have to be realistic in what they demand from the practices in terms of uptake of prescribing interventions. GPs warned that it could take a long time to influence a doctor’s prescribing as GPs are independent and conservative.

"I think clinical freedom is something that GPs do feel quite strongly about. We are a fairly conservative bunch and we need to be exposed to new ideas and to change incrementally as we go along" (GP9;PCT2;M)

"What I have learnt is how very long it takes to influence and change things within the NHS, we are talking years. Especially when it comes to influencing anyone’s prescribing" (GP2;PCT1;F)

Practical solutions for increased uptake of prescribing interventions included: to ensure simplicity of the intervention; to have regular contact between the GP and the PAs,
preferably face-to-face; to make some educational activities mandatory; to provide feedback and follow-ups from the PCT; to work via peer pressure; and to make sure that the interventions were well organised. GPs also suggested to deanonymise prescribing data in order to increase peer pressure to increase quality of prescribing.

"I would be perfectly happy if my own individual practice wanted to deanonymise data but I think it is harder for those who are extremes, of both cost and quality initiatives so you know, I think it is something we can volunteer to do but I wouldn't want it to be imposed really." (GP2;PCT1;F)

"Deanonymisation would be an important part because how can you discuss prescribing if you don't know exactly what you do. I need to know what you do, for me and you to have a meaningful discussion, rather than both of us pretending that we are very good" (GP25;PCT1;M)

"Every practice should be sent a document that says, you have applied for X, Y and Z, you know, this is what you have to do by this date and this is what you have to do by that date and that is what you have to do by that date...I think it all has to come from one place. And it has to be a named person who deals with a particular scheme" (GP10;PCT1;F)

"I think the challenge for the PCT is to try and inculcate change without putting people off, so to inculcate change without threatening people. But sometimes you need that, some people need a little bit of threat....Some of these visits may be compulsory and some of their training need to be compulsory, not voluntary" (GP25;PCT1;M)

Change should be addressed so that GPs had ownership over the proposals as only those that were perceived as necessary seemed to be enacted.

"Barriers to change include whether people really are convinced about what they have been told about and also if there is conflicting pressure the other way which may involve patient dissatisfaction" (GP5;PCT2;F)

"Provide you can convince me that it is a reasonable sequence of events, and so we have derived the discussion and that it is reasonable, that that there is general GP consensus in the area. That means that I would tend to go along with it" (GP25;PCT1;M)

One GP suggested that certain practices needed more help from the PCT and that the PCT could target these practices. While this approach may be effective, collaboration with the PCT could also be associated with stigma.

"The only way you are going to reach them is individual targeting. And that is very difficult because then it looks like you are pointing the finger and picking" (GP23;PCT2;F)
One GP recognised that the PCT has few means by which they can rectify 'bad' prescribing.

"Issues about resources on their part where they identified someone who’s prescribing can be better and they [PCTs] are fairly h mi ted in how they can act upon that"  

(GP18;PCT2;M)

6.3.7.2 Stakeholders’ views on the PCT organisation and prescribing advisors

The stakeholders thought that collaboration with the GPs functioned well, that it was well organised and that they had, at least some, influence on GP prescribing. More pessimistic stakeholders added that GPs are independent contractors and thus the Government has little influence on prescribing.

"We have a very effective medicine prescribing sub-committee which everybody says to me “that is really good, it works really well”. One of the lead GPs, the lead GP from primary care committee said that that is working really well,...I think we are quite well off but we are still fighting a losing battle”  

(SH35;PCTX;F)

"I would like to think that we have some influence but I’m leaving us to last because I think, because I think we probably have the smallest amount of influence...the fact that GPs are all independent contractors means that actually the Government directly has very little influence on prescribing... so, it’s influences are probably exerted through us and people like us who are trying to achieve Government targets on behalf of the Government, err, and in that way the way that, the way that the NHS is organised, at least for primary care,... has very little influence. I don’t know if that’s the right answer”  

(SH21;PCT2;F)

Some stakeholders thought their role was to provide support; to help GPs improve their prescribing by filtering messages and condensing information. Other stakeholders felt that in addition, they also had a controlling role but that tools for enforcement was lacking.

"We can filter the right information to get it to them so that they don’t have to do as much. So that is facilitation. We are there as an in-house support for them; to do the audits, to write the audits, and to discuss the results”  

(SH19;PCT2;F)

"I think it is difficult in, you know, how far you can go with giving people carrots...at the end of the day this is what it should be about and we shouldn’t have to reward you for, you know, spending money properly or not,...You are not sort of allowed to beat people. But I think it is a very, very difficult balance really”  

(SH29;PCT2;F)

"I think that if you are influencing, you have to use a range of methods you can’t just use one method, so you don’t always have many sticks - particularly if you are dealing with independent contractors so you have to have some carrots as well and use the sticks were you have”  

(SH34;PCT2;F)
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While stakeholders said they were clear about their own agenda they criticised the wider NHS for that a unified approach implementing prescribing initiatives was lacking and that messages were scattered. Stakeholders felt they had to compete for GPs’ attention. Stakeholders thought that if GPs understood the structure of the prescribing agenda and the Government’s implementation strategy, their impact would be larger.

“I think the real barrier is, with this and the prescribing incentive scheme as with any sort of information that goes out, is that is actually disseminating it and facilitating it at practice and prescribing level and actually getting somebody’s attention to look at whatever you wanted ...All are saying “my changes are important” and I think that is what is hard” (SH22;PCT2;F)

“Everything seems to come out in separate documents etc. and you know it is having to make those links and if people don’t understand it locally even at PCT level what a pharmacist can do or what the potential is, it is very difficult... they [the Government] should be linking things together” (SH36;PCTX;F)

Nearly all stakeholders said they wanted to have more influence on policy of prescribing implying that they thought they had too little influence over GP prescribing.

“Yes! (Laugh) “You do as I say”! Well, surely everybody in my position would say yes they would like to have more influence in prescribing” (SH35;PCTX;F)

“Yes, we would always like to have more influence on prescribing, because we know that there is a lot daft prescribing out there, so there is always changes and improvements to make” (SH21;PCT2;F)

Stakeholders were concerned about the level of pressure and pace at which changes are pushed, which also concerned some GPs. Stakeholder thought that too much pressure and the too high tempo of implementation could ‘backfire’.

“(Pause) Well, I don’t know, I mean, I think we have quite a lot of influence on prescribing....It would be good to have a bit more influence but you have to bear in mind that it might backfire if you push it too far.” (SH19;PCT2;F)

“Yeah, I think that, you know if you take it very, very slowly and you know you don’t want to GPs to think you are coming in and telling them what to do so you have to sort of keep tripping away and get them into sort of your confidence really before we can make any big changes. But yes I would like to see that has been a lot more sort of like governance over it” (SH29;PCT2;F)

It was felt that representing an authority was a barrier in itself when implementing initiatives. One stakeholder that worked within secondary care thought that perhaps the PCTs lacked in capacity and experience in producing large scale change.
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“I think there are organisational barriers about the fact that I am an external person and that brings its own sort of baggage with it”
(SH22;PCT2;F)

“In secondary care there are a lot of people have organisational experience so they used to producing change in big organisations worse most of the people we go and work in primary care have never operated at that level”
(SH37;M)

One stakeholder also recognised there was a professional barrier between pharmacists and doctors in prescribing.

“I would quite like to see other people involved because otherwise they, they would just see us as a bunch of pharmacists that are coming up with, you know, what do we know, we don’t prescribe so and we are not out in practice”
(SH29;PCT2;F)

Stakeholders mentioned some facilitators to change that were also mentioned by GPs; including face-to-face contact.

“Face to face contact is best but I think the biggest kind of barrier is for practices who are really fairly disorganised in how they practice and are just surviving and coping with seeing patients without really thinking and reflecting on their own practice”
(SH27;PCT1;F)

Although not common, stakeholders gave examples of strained relationships with GPs. Reasons for this included: unwillingness to change; disagreement of basis for contact; and a feeling of being checked up on. The medical profession have a monopoly in healing patients and perhaps is this why doctors are not used to be advised or questioned in their practice (Duggan, 1998).

“Approximately 8 or 9 % don’t want to work with us and that, again, that is a barrier”
(SH22;PCT2;F)

“If they really don’t want to sit and talk to you they are not going to change their prescribing practice after what you have said”
(SH35;PCTX;F)

“I think when medical advisers [PAs] first came into place they were very cost concerned of prescribing and some people we just turned off by that, and I think it takes a long time to get back into practice and show them what you can offer them support-wise, beneficial, once they see that they will turn around, but you know, I have been here for two and a half years and we have a couple of practices we don’t go into”
(SH28;PCTX;F)

“I think they [GPs] are a bit scared, because we come in there and check up on them obviously when you go into practice you do get exposure to pretty much everything you know we have access to most of the information they have access to and sometimes it means that you go in there and discover things that they were not thinking you would discover and then that has to be reported, so that might be a barrier for them”
(SH19;PCT2;F)
Stakeholders were firm in their opinion that there were too few pharmacists working with prescribing support and that resources were lacking for extending this collaboration. Stakeholders gave examples on how they would like to see the role of practice pharmacists to be taken forward.

“Not enough pharmacists and there is not enough expertise within the patch or really within the whole health economy in that the UK to sort out prescribing to the extent it needs to be done”

(SH37;M)

“The pharmacists role would be to get practitioners engaged first of all, that’s what is most obvious to try to get people engaged in both sectors to agree to what best practice is...Pharmacist’s role is searching the literature, finding out what best practice should be,...Just providing those reminders, cause when you have got 150 other things going on for one patient then prescribing perhaps isn’t the forefront of every medic’s brain, and actually that is your, my job as a pharmacist is to cover for that, to fill that gap, really”

(SH21;PCT2;F)

“If you can have a pharmacist in there helping the GP, that would free up time, running clinics for them, for me that would be a really sort of beneficial role; in there helping them; supporting them; review with patients, I think it needs to be a pharmacist. I think that would be a dream intervention I think, giving them somebody. I think that would win more than financial incentives”

(SH28;PCTX;F)
6.3.8 Opinions of formularies and prescribing incentive schemes

This section discusses perceptions of local formularies and guidelines and the prescribing incentive scheme. The reasons for investigating these in detail were i) their perceived importance by national forces; the PIS was mandatory and local guidelines and formularies strongly encouraged and ii) that GPs in the study PCTs perceived local formularies as the most important factor influencing prescribing according to the first survey (4.3.6.2). The section begins with some practical and conceptual issues of prescribing impact.

6.3.8.1 GPs’ opinions of formularies and prescribing incentive schemes

GPs thought that prescribing initiatives would change in the future but that some would remain in their current form, at least in the immediate term. The PCT would continue to act as the middle-road to implementing new initiatives between the commissioning NHS and the executing GP practices. Pharmacist prescribing and medicines management were welcomed initiatives by at least some GPs. One GP expressed the benefit of continuing with the same types of interventions in order to improve prescribing as change does not happen instantaneously.

"If you have to shape the future you just have to carry on what you are doing and give it time. If you keep changing things you will never achieve anything. I think I am convinced about what we have been doing in the incentive scheme, education, formulary newsletters. We need to give it another couple of years and just keep doing the same thing and lots and lots of education seminars."

(GP7;PCT1;M)

GPs spoke about the importance of having a ‘meeting point’ from where the intervention was commissioned and could be discussed, for example GP forum meetings, educational meeting or other practice meetings. The PCT offices could also be used as a point of contact. GPs’ attendance to meetings was however dictated by time. PCTs should be careful how many meetings they call together not to overload GPs; some practices solved this by sending one representative.

"I think those meetings tend sometimes you have to be, you have to be kind of quite selective of how many you run because people can get a bit, feeling like they have been urged into things"

(GP1;PCT1;M)

"Generally speaking we would try and get someone from the practice along but we would not all go along"

(GP14;PCT2;F)
While GPs believed that it was their responsibility to take part in initiatives the PCT should take the responsibility for commissioning and driving the intervention. One GP provided an example of successful implementation of a local guideline that was run by the Clinical Effectiveness Group.

"The clinical effectiveness group you probably know about have produced a number of guidelines notably for CHD, diabetes, hypertension, mental health and I think people do take some note of those although again, it is a bit variable. So those have been good initiatives because they have been followed up with workshop and people get something, it is not just about something being sent through the post and you should do this but they have been followed up with some workshops and facilitated workshops, clinically based. So that has been a big influence."

(GP1;PCT1;M)

GPs expected that the new GMS contract would change prescribing activities, but the contract was not published in full or implemented at the time of the interviews so only speculations could be made. The contract was regarded in positive terms except for the critique that it would not promote equity between practices. GPs hoped that the contract would increase quality of care and quality of prescribing by having quality markers dictating GPs’ pay.

"I have a feeling that the new contract will roll in a lot of incentives so hopefully that will be the best of both worlds rather than the worst about both worlds and there will be a national scheme that the profession is happy with, but that also will drive up the quality of practice and that would very definite be a good thing... we yet don’t know what the new contract will hold but so whether there will be prescribing quality issues within the new contract or whether because things will change, the ideal is that you learn from an incentive scheme."

(GP9;PCT2;M)

Formularies and guidelines

A proportion of the respondents to the first questionnaire said that they needed ‘more knowledge to use the local formulary to the full’ (PCT1 29%; 29 and PCT2 58%; 39), especially in PCT2 where the demand was greater (U-test=2239.5; p<0.0001) (section 4.3.6.3). When asked, no interviewed GP thought that the local formulary was unclear and none of them said that they needed more knowledge to be able to use the formulary to the ‘full’. The interviewed GPs suggested that the demand for ‘more knowledge’ could relate to demand for additional information about the evidence used in the formulary. Other GPs suggested that demand for ‘more knowledge’ was a sign of a GP having difficulties with prescribing in general or being unwilling to use the formulary. Another GP implied the opposite; that GPs who asked for more knowledge were those
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who used it frequently. Thus, reasons for the demand of more knowledge in the questionnaire could have several explanations.

“I don’t think you need additional knowledge to use it but I probably think you want additional knowledge so that you can’t question it and raise concerns”
(GP18;PCT2;M)

“The people who probably say they find it difficult probably have difficulties with other things as well, not just the formulary… it’s probably that they don’t want to use it”
(GP7;PCT1;M)

GPs said that new prescribing information must come with education and that solely posting out new formularies and guidelines would not suffice for full implementation. GPs recommended the PCT to use various methods to disseminate information and to make sure to explain the purpose of the formulary. One GP mentioned the benefit of workshops accompanying the launch of a local guideline. Computer based guidelines were suggested for increased accessibility.

“Producing guidelines - that doesn’t change people’s practice. They only way to change people’s practice is to actually, you know… you need to educate!”
(GP23;PCT2;F)

“You have to explain them what the reasons are behind those guidelines because most of them think it is a cost cutting drama but it is not really, so you have to explain more than that.”
(GP7;PCT1;M)

“I don’t think sharing information by sending it through the post to all the doctors does work very well as I said,…even if is it useful it will still be put on a pile ‘to keep’, but people will not necessarily have time or be bothered to look at it thoroughly.”
(GP13;PCT1;M)

“Guidelines or recommendations they need to be quite accessible. I’d prefer things on the Internet.”
(GP24;PCT2;F)

Some GPs preferred the local formularies to national, but the opposite was also true. While some GPs found the local formularies greatly useful, others were hesitant.

“The NICE guidelines would come down at the bottom there because although I know they are important on certain drugs they do not affect my prescribing as the local guidelines do.”
(GP25;PCT1;M)

“I have to say from a personal point of view I am not totally convinced about the value of local formularies. I kind of can’t quite convince myself that there is a need for having national formulary and a local formulary.”
(GP1;PCT1;M)

“I think you can practice all of general practice medicine using the formulary, you know, how often would you need to use something outside that? Very rarely, I think.”
(GP25;PCT1;M)
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Several GPs warned of making the formularies too lengthy, looking like academic papers as that could decrease their utility.

"The Pharmaceutical advisor is still writing chapters and I mean what is happening now is that the effect is that now you are getting things that are almost textbooks for medicine. No one is going to read them! I am afraid and I hate to say that, and I can't bear to tell her really, you know, she would be so upset but I am afraid that, that is... because it is a combination of a guideline and a formulary, and it is not longer a formulary."

(GP1;PCT1;M)

GPs were asked whether they prescribed according to the advice in the local formulary and how much influence on their prescribing they attributed to the formulary. The amount of prescribing influence ranged from having no influence (as they had never seen the formulary) to having an impact on their prescribing. The local guideline in PCT2 was distributed at PCT meetings and consequently GPs who had not attended such a meeting had not received the guideline, as learnt from the interviews. Although GPs thought local formularies were useful in general, their use still seemed sparse. Figure 6.4 illustrates the range of views that GPs held in regard to compliance to the local formulary/guideline and how they utilised the guidance. Whilst there was no quantitative measure attached to the quotes, the GPs that expressed a stronger compliance are quoted to the right in the figure. Commonly, GPs who had not made much use of the formulary gave answers as exemplified below:

"I read through it when I got it, I don't read through it... I mean if I need to look up a drug or want to know what to prescribe I use the BNF rather than that"

(GP13;PCT1;M)

"I have to admit I do not often have a guideline out in front of me and follow through a flow chart, but I think when they come out you read them through and that is an educational experience and so it affects guidance"

(GP9;PCT2;M)

"As for the PCT producing a formulary, well as I said I have never looked at it so I suppose that is a fairly powerful comment in itself"

(GP12;PCT2;M)

"I have not even got one, isn't that bad! I have had one sent to me, but I never actually got it in my hands because I never went to pick it up, so I have not a written copy, so that kind of makes it hard"

(GP24;PCT2;F)
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Figure 6.4 Examples of GPs views on adherence to local formularies (increasing adherence is to the right)

GPs seemed relatively unconcerned whether they followed formulary advice and most of them thought their prescribing was more or less in line with the formulary, but gave no further evidence for this. Different GPs may have their own concept of what is compliant and what is non-compliant. The accuracy between perceptions of compliance and actual compliance could be assessed by further relating prescribing data to perceptions of compliance.

Prescribing incentive schemes

Although this presentation focuses on the prescribing incentives schemes (PIS) and the adjoined financial incentives pre 2002 when the interviews were undertaken, the use of financial remuneration for service and quality will continue in the new GMS contract. This makes the findings from the interview still valuable for gauging opinions of target related pay. GPs saw the PIS as a mean to promote generic, cost-effective, yet high quality prescribing. They thought it was an important initiative that provided opportunities for continuing education and a tool to compare prescribing between practices.
"It has made us do the audits as a practice and take it seriously and also be able to compare ourselves with others, which I think is hugely helpful...the incentive scheme is a pressure on GPs to prescribe cost-effectively but I think the vast majority of GPs want to and try to."

(GP2;PCT1;F)

GPs expected the PIS to be redundant when the GMS contract is implemented as they resemble each other. Hence, the same criticism could remain for the GMS:

"I think the new contract, assuming it is influencing the way it anticipates, will make incentive schemes in their current form redundant. The incentive package which will look far more like the PMS contract will mean that global quality will be rewarded with global money, and that is probably better because that would remove a lot of the perverse issues that we talked about...the current system and to some extent the new system is not going to be any different: It doesn't encourage equity but actually results in a wider spread between the leading edge and the trailing edge."

(GP11;PCT1;M)

Another reason the PIS was not seen as inherently positive was that it was driven by incentive money. GPs thought that it took little consideration of the variability in population between practices.

"The problem you have with the prescribing incentive scheme is that it is encouraging people to do exactly the same whether they want to or not and whether it matches their own practice or not, plans for developments or not, and stifles innovation"

(GP11;PCT1;M)

Attitudes towards the schemes and financial incentives varied between GPs; some GPs described the scheme as a mean for achieving prescribing change and that the financial incentives were an acknowledgement of good care, whereas others only participated in the schemes to get the 'cash'.

"I supposed that the prescribing incentives are an acknowledgement, if you like, of quality"

(GP14;PCT2;F)

"This year it all seems pretty much of a waste of time but we will do them anyway just so that we will get the money."

(GP12;PCT2;M)

Financial incentives have two sides involved; the receiver (GP) and the provider (the Government and ultimately the tax payers). In order to be an effective means for change, the intervention has to be priced so that it seems worthwhile for the receiver while at the same keeping the costs as low as possible for the provider. There were those who meant that incentives helped focusing ones mind to undertake an intervention in situations when the intervention itself did not carry the importance to be prioritised by the GPs. Many GPs claimed that financial incentives were an important reason for prescribing change. Many GPs took a pragmatic middle ground and thought that if the
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financial incentives would improve prescribing there was no harm in using them. The range of responses below showed that financial incentives were a contentious issue.

"if there is a lot of work involved and there is not much money then you know, you might think that it is not worth it... If there is a very strong research evidence that there is a large benefit for the patient then that would be motivation enough but if you feel you are doing it to meet a Government target for which the evidence is not particularly strong, the amount of money then becomes a more important incentive"

(GP14;PCT2;F)

"If the Government feels something is important enough actually to pay us to do, they must [have] some good reason for actually doing that."

(GP9;PCT2;M)

"I think they [incentive schemes] do work. Maybe, we are just merchants, we doctors..."

(GP10;PCT1;F)

"not only give us an incentive that we have to do something for which we are rewarded and but also gives a better care to the patient. Because of the workload we may not be looking into the matter but now because of the incentive we would like to do that even without it we would have done it and but that it gives us more, you know, incentive to do that much better."

(GP4;PCT1;M)

"[Financial incentives] is the reason we are seeing a shift in changing prescribing habits."

(GP7;PCT1;M)

"What is the word I am looking for... not motivation but an incentive to change, like the incentive scheme and getting money for it. In the end, money talks."

(GP18;PCT2;M)

Some GPs thought that financial incentives could have a negative effect on relations between GPs and between GPs and stakeholders; that it could cause competition between practices and demoralise practices that fail the audits. GPs thought that the PIS were unfair towards practices that did not have a lot of administrative support. Those who were less positive towards financial incentives meant that they could oppose or halt equality of care developments. A couple of GPs felt that attention should instead be focused towards the practises that fail the incentive scheme.

"They should be putting money into the practices that fail to do an audit. They would also obviously not just have to give money but give a lot of education and it would have to have a compulsion attached to it"

(GP12;PCT2;M)

"It also mitigates against those practices that don’t have staff [administrative staff] that can do this [incentive scheme] because a lot of this work is done by people who are not doctors. Most of it should be done by people who are not doctors, the auditing I think, and some practices just don’t have the mankind. So, it tends to be "to those of you that have that, you should be given"

(GP1;PCT1;M)

One GP wanted to use the incentive money to pay for educational courses rather than to give it back to GPs as cash.
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“Day courses, there was a day course in diabetes where they got lots of speakers in and got into work shops and things like that is certainly more effective rather than dangling £500 cash bangles, really. I think that way people suddenly realise that they keep up to date and think about what they are prescribing.”

(GP16;PCT1;M)

One GP expressed that money can create perverse prescribing in order to qualify for the reward. Hence, it was important that schemes were designed so that this could not happen.

“I think they need to be very carefully developed. You can get some paradoxical prescribing, very perverse if the incentives are not thought through very carefully. They can be misused where the initial intention is clear but in fact the outcome is not. Where finance is the only driver, people will use very perverse approaches in order to achieve the financial outcomes without necessarily improving the quality of care for patients”

(GP11;PCT1;M)

The GPs that felt strongest against financial incentives often disagreed with them on a conceptual level. Their arguments were often based on ethical or political views. They meant that GPs should be doing a good job without any extra payment and that using financial incentives sent the wrong message in terms of accountability.

“You should be doing it anyway, if you are a good doctor you should be doing it anyway, you should not need the cash...their [GPs] way of thinking is just concrete thinking. They are not flexible to change, so hence we have to put cash in a dangler...that is wrong”

(GP16;PCT1;M)

“They work to corrupt to people and make them cynical and they do have an effect, yes I think they probably do push once activities in a certain direction. I don’t approve of them on an ethical ground. It is a way of trying to treat people as if they belong in some kind of very competitive commercial enterprise”

(GP12;PCT2;M)

GPs were not united in regard to the importance and amount of the financial reward. Some thought that the sums were small and not sufficient to make great improvements for quality of prescribing. Others thought the sum; large or small, made no difference to achievements. The incentives money was described as ‘peanuts’ whereas others thought sums were too high. One GP explained that they were poorly paid and therefore sums were important.

“I am bothered by the fact that I think the amount of money is too much”

(GP1;PCT1;M)

“Really, it is not the sum of money- it is the sort of focusing the attention, the sums are relatively small”

(GP2;PCT1;F)

“very small amounts, like £500 for the incentive scheme”

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"They are peanuts, they are not much. You know is not going to help that much unless they say OK we will give £10,000 if you achieve the target; everybody will work hard to achieve that. The GPs are ...yes, it is a matter of the amount and GPs are poorly paid"

(GP6;PCT2;M)

6.3.8.2 Stakeholders’ opinions of formularies and prescribing incentive schemes

Almost all stakeholders thought that future prescribing interventions would look different from the present. Electronic advances, the new GMS contract, organisational changes within primary and secondary care and the new role of pharmacists would contribute to the change of prescribing initiatives. Interventions should be tailored to practices and could need continuous change in order to make them interesting to GPs.

"I hope they will change but they don’t know how...I think they get bored doing the same sort of thing and the same principle the whole time so it might be good to have something completely new and radical"

(SH19;PCT2;F)

"I think there will be some practices where you go on having to do what you are doing today and that will be others were you might operate differently so if you have got no repeat prescribing review going on then you would be working on that, so once you have got a practice into the habit of doing something else you would move on to another area"

(SH31;PCTX;F)

Many respondents relied on electronic advances for future interventions. Extended use of electronic patient records, decision support systems and the use of Intranet for communicating between the PCTs and GP practices comprised the main themes. The below quote exemplifies stakeholders’ thoughts;

"I think that IT will help us a lot in that at the moment we still can’t make good IT links between GP computer systems and our formularies, there aren’t IT links between CP and GPs at the moment and there is not a shared common data set for patient information, so I think that we will be in a position to have regular updates so when new evidence comes through if an old drug pops up we will be able to say err... have a warning on the screen"

(SH22;PCT2;F)

Formularies

Stakeholders thought that the way in which the formulary was developed and implemented was pertinent to its uptake by GPs. The ownership and collaboration around the production of the formulary was important; more important than the end product, as voiced by one stakeholder. It is known from literature that clinicians are more likely to follow guidelines if they have been involved in the creation of them but still this does not guarantee uptake (Jones et al., 1993).
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“We don’t have a PCT wide formulary, and in fact we have not really sort of gone down that route in the past because there are a number of issues around formulary development partly whether you develop it at GP practices or whether you do something PCT wide. If you do something on PCT level then it is often quite difficult to implement it at practice level because people don’t necessarily sign up to it.”
(SH34;PCTX;F)

“I doubt the value of spending a lot of time developing a formulary which requires regular up-dating, which is not necessarily going to be complied with, if you don’t have the people in place to support the practices in implementing it.”
(SH34;PCTX;F)

“The role of guideline is about the process, not about the outcome. It is about getting people to agree things, local ownership of it that is fed down to grass roots...I don’t think there is any value in taking a piece of guidance from LSL and saying to a PCT “there you are there is some guidelines, you can use them” because they never would, they would go straight in the bin. It is a process, I think guideline production is a process and it is not the piece of paper at the end.”
(SH33;F)

Stakeholders did not agree what comprised a formulary or its utility. If stakeholders have different views on the usefulness of formularies GPs may have similar disagreements. GP who favours guidelines may not pay much attention to a PCT formulary.

“A formulary to my mind is just a list of drugs...It doesn’t always tell you how to use them, it doesn’t tell you in which circumstances, in which order to try different classes of drugs, whereas a guideline will.”
(SH22;PCTX;F)

“It is not a list of drugs, you know, I could have given them a pharmacy stock list.”
(SH3;M)

“It [formulary] is narrowing down drug choices, but that’s not always, it is not the most important task, because the most important task is that the appropriate patients are on an ACE inhibitor but a formulary can give practitioners more information about which ACE inhibitor has the most evidence base, which cost the most, and what doses are they given in - a bit more detail I suppose.”
(SH21;PCTX;F)

“A formulary is purely drug based and I would say that it is a totally different type of thing, to me I would prefer to produce clinical guidelines rather than formulary”
(SH28;PCTX;F)

“I mean that they think it is more as like we are trying to restrict their clinical freedom...I think we need to try and get through to those GPs and really we are not trying to restrict their clinical freedom we are trying, we based the formulary on the best practice evidence available at the time of production. You know, it has been peer reviewed and it is what is considered to best practice.”
(SH32;PCTX;F)

Stakeholders may have disagreed on the issues but gave a lot of detail about the role, value and utility of formularies and guidelines. They thought that GPs found them useful in their prescribing decisions although some prescribing advisors were unsure.

“I think people find it useful to have something that says “well, there is, this is what we recommend you to use”
(SH3;M)
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I think if you ask a GP they are very appreciative of it [clinical guidelines] particularly those which are not their area of expertise.

(SH21;PCT2;F)

"I am yet to find out how useful they are because they’re not come across any... good data; been able to weigh the usefulness of it but I would say, yes I would say it is good to have a formulary for a Trust"

(SH20;PCT1;F)

"A formulary on its own is not suitable in primary care anymore, in hospital setting yes, because patients are ill, they have limited resources to and they can’t stock every single drug in there because they want to get the drugs to the patients quickly so, in hospital you would expect to have a formulary but I think in primary care you need guidelines.

(SH28;PCTX;F)

Many stakeholders mentioned that the reason for guidelines were to provide equity of care, to promote good prescribing practice and to start a dialogue of prescribing.

"We have to have the guidelines I think, although they always need to be room for tailor them to individual patients I still think we have to have them, because there is so much evidence out there and so much we don’t know that there has to be some sort of consensus about how patients should be managed so that, if I go to Glasgow I get managed in the same way as if I was ill here, I mean it is about equality of treatment."

(SH21;PCT2;F)

"I suppose it provides them with some reassurance they are working in line with good practice if the guideline is from a good source."

(SH31;PCTX;F)

A couple of respondents thought that formularies would be increasingly important due to the current financial constraints in the NHS. This argument was not heard from GPs.

"I think that the financial constraints that the NHS finds itself under, might mean that ultimately we have to have a more prescriptive national formulary other that just the local one, err... So you know, I can’t imagine that we will end up because of the political power the pharmaceutical industry has, I can’t imagine we will lend up like New Zealand where you know there are only one or two ACE inhibitors that are reimbursed on their NHS but I think we will find that there will be much more of a negotiation around drug pricing, we may even find that locally we will be able to have negotiations around drug pricing which will mean that we will have much more restricted reimbursement on the NHS"

(SH22;PCT2;F)

It was recognised by two stakeholders that the formularies had to be brief in order to be useful as doctors make their prescribing decisions in a short space of time.

"I think this better to have something easy to read which refers the reader to a guideline if they want some background information because most people will make a prescribing decision within two minutes they haven’t got time to access a big text book of guidelines whilst they are at the patient bedside."

(SH3;M)

"I think if you try to incorporate too much information in there you lose what you’re trying to get to."

(SH32;PCT1;F)

One stakeholder mentioned how the utility of the current formulary would be improved:
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"I think probably it would be more useful if they were actually integrated into the actual action of prescribing rather than as a separate tool, so that in order to be able to prescribe you would have to look at the formulary or the guidelines, so again the whole decision support then and but I think more it is about what you do or how you use a your guideline or formulary"

(SH27;PCT1;F)

Prescribing incentive schemes

In accordance with Government legislation, all PCTs that were represented in the interviews had a PIS. The PIS was used to raise awareness within certain clinical areas and to promote quality of prescribing in that area. The outermost motive with the PIS was to raise quality of care for the patients.

"I would like to think that they would have the perception that what we are putting in the scheme is for the benefit of their patients ultimately, and for their ease as well because if they know what to do and what to prescribing certain situations it should generally make it easier although that could be perceived to be a limitation of their choice"

(SH19;PCT2;F)

The drawback with PISs, as one stakeholder mentioned, was that they did not promote overall prescribing. The same stakeholder added that the PIS may not incorporate the most important or best designed audits but only what can be easily measured. Another stakeholder did not approve of the PISs.

"Within the prescribing incentive scheme you can only focus on a narrow range of things each year because you can only get people to do so much, whereas what you really need to do is to shift the general quality of their prescribing and what you hope is that where you have made changes in one area it will stimulate them to look at and make changes in other areas as well"

(SH22;PCT2;F)

"I think the prescribing incentive scheme has been successful...we use prescribing indicators because we have this wealth of data but it may not be the most appropriate thing to measure"

(SH22;PCT2;F)

"I think the reason that prescribing is so heavily managed is it is very measurable"

(SH34;PCTX;F)

"Work on incentive schemes and on influencing people is, I think, is being poorly focused because it is expensive and not that effective"

(SH37;M)

One stakeholder thought that there could be motives other than financial incentives for participating in the schemes, such as peer comparisons even though data was not disclosed.

"Some practices will change their prescribing, they might be changing it to getting the Incentive Scheme payment or they might change it because they are embarrassed with their performance in comparison with their peers, not that their peers will know who they are but just the shock discovery of finding your prescribing is way off from your next-door neighbour practices may lead them to make some changes to look at their prescribing and to see whether they need to make some changes."

(SH31;PCTX;F)
Stakeholders pointed out what GPs were saying; that the PIS could potentially stifle innovation, and gave examples of discouraged practices.

“Maybe not recognising how their practice compared with other practices in the area, so they were just reluctant basically. So that resulted in pulling out of the scheme they just didn’t want to know basically,… they haven’t met their targets for the past two years running”

(SH19;PCT2;F)

“I think some practices as though disheartened because they never achieve the target that they then stop trying to, and that is the problem”

(SH28;PCTX;F)

Like GPs, stakeholders also recognised the potential problem with perverse incentives, for example that GPs would put ‘every patient’ on statins in order to reach target and receive the financial reward. While both GPs and stakeholders spoke about perverse incentives, no evidence was given to how big of a problem this really is.

“The criticism with incentive schemes is that there are quite often perverse incentives to meeting those targets, so they may prescribe inappropriately for a while if it means that they are going to achieve a the target and receive a financial benefit”

(SH34;PCTX;F)

Stakeholders that had a more positive attitude towards financial incentives often justified themselves on pragmatic grounds ‘if it works-why not?’ Arguments against having financial incentives were that they were unfair to the patient; that some practices will be having more money to invest for increased quality of care.

“I don’t think it is fair really because it might be if my GPs practice didn’t get it and I had to sit in a hot room because they couldn’t get air-conditioning or something because they didn’t get to an incentive, is that fair? I don’t think so.”

(SH28;PCTX;F)

Others meant that financial incentives did not exist within secondary care and questioned the rationale for having financial incentives in primary care. Respondents meant that the GPs get paid a salary for providing good quality of care and that no extra money should be paid out for these purposes. Stakeholders disagreed about whether the financial rewards were too low or too high.
6.3.9 Commercial influences on prescribing

Commercial influences included marketing methods used by the pharmaceutical industry such as drug representatives, sponsored meetings and advertisements and the PCT’s role in these issues. It is noteworthy that the interview schedule did not include any issues of commercial influence from the start, but as respondents spoke about these at length such prompts were later incorporated.

6.3.9.1 GPs’ opinions of commercial influences

Prescribing information and influence from the pharmaceutical industry was disapproved of by most GPs as they thought it could affect their prescribing adversely.

“Commercial aspect with general practice and pharmacy can be a barrier to prescribing ... I am not at all keen on the influence of the pharmaceutical industry which obviously does influence us, the influence of advertising etc. can be very negative”

(GP2; PCT1; F)

“I am fairly horrified by the fact that we seem to have drug reps around who are promoting things which go very much against what our own local policy would be. To me drug reps are a very poor way of getting medical education for doctors”

(GP9; PCT2; M)

Although many GPs preferred ‘non-commercial’ information (such as evidence-based literature, PCT advisors, clinical guidelines and formularies) to ‘commercial’ information but the interviews revealed that some GPs communicated with the pharmaceutical industry. All but one GP that met drug representatives denied being ‘influenced’ by them. Evidence from literature says that drug representatives do influence prescribers (section 1.4.6).

“I’m not influenced by the drug people. If the drug person comes to me and tells me some drug is good... in those situations you can use these drugs on a few patients and see whether it will help the patient, but at the end of the day you are allowed to look into the research materials whether it is helping which is already proved research not one which is ongoing and they don’t know yet - but already approved research, then you can try those things”

(GP4; PCT1; M)

“We don’t see drug reps here and I don’t think I have ever been very influenced by drug reps. I mean, I always listen to what they have to say, but I don’t think my prescribing is influenced by them at all”

(GP13; PCT1; M)

“Sometimes it can be you meet the rep and you want to try his drug for a particular few days, so that has an influence”

(GP26; PCT2; M)
According to one GP, marketing activities used to be more widespread than it currently is. This may be why GPs who qualified earlier more often said that they were influenced by commercial entities than did those who qualified later (section 4.3.9.4).

"Definitely there has been a lot of change in the last sort of five to 10 years anyway. I think a lot of it GP prescribing used to be drug company based and drug company educational meetings"
(GP24;PCT2;F)

One GP that was in contact with the pharmaceutical industry thought the non-commercial sources, such as the PCT, should help and evaluate the commercial information and authorise the use of new drugs. This GP also implied that consultants provided a non-commercial source of information – something that was opposed by another GP.

"Quite a few new drugs that come into the market and are not directly tested at any level except by the drug companies, so it would be nice if the PCT got involved with those new drugs, either get the information from the local consultants to see what they think of them, so we can feel more free to prescribe them without any worries of any side-effects"
(GP26;PCT2;M)

"There are plenty of drug companies that buy off consultants to write reports"
(GP7;PCT1;M)

GPs explained that it was difficult to shield off drug representative information and gave examples of how the pharmaceutical industry managed to get their messages through, such as sponsored meetings and audits that were undertaken by representatives from the industry. It is worth mentioning in this discussion that the British Medical Journal (BMJ), the New England Journal of Medicine and the Journal of American Medical Association all receive money from advertising. The Editor in Chief for the BMJ explained that the income from commercial advertisements is used to increase the spread and quality of the journal (Smith, 2003). The quote below illustrates a perception of two ways in which marketing activities were disguised.

"There are some rather strange meetings that go on in GP surgeries, which you probably don’t ever hear about, but a GP will have a seminar on something like asthma care or something, you know, and he will be sponsored by the rep and he would charge the rep per person who comes, for you know entertainment and food, and then they will get a take away and they will make a profit. There are a few GPs that will actually make a profit from these kinds of meetings. A bit dodgy really... Now it is the “Would you like us to do an audit for your use?” where they come along and say “it is not anything to do with promotion, it is a nurse, an independent nurse will come and do the audit for you”, but then they find that they get people to change onto their preparations so it is a marketing thing, but under a different guise, so it is quite a lot of that goes on. And people are still gullible to that.”
(GP1;PCT1;M)
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GPs pointed out that certain types of practices were an easier target for drug representatives. This statement was supported by the results from the questionnaire (section 4.3.9.4) where GPs in cluster 1 qualified earlier than GPs in other clusters and more often worked in a small practice.

"It is no doubt that drug rep penetration of those [small] surgeries is quite high and we know there is loads of evidence that drug reps change prescribing and they change prescribing in an adverse way"

(GP25;PCT1;M)

PCT2 took a novel approach in autumn 2001 and arranged an industry sponsored meeting for GPs. This approach seemed to have affected attendance at the meeting; several GPs said they would not attend sponsored PCT meetings as they thought it was inappropriate for the PCT to get involved with the industry. The approach by the PCT may have been deliberate in order to attract GPs that not normally come to meetings; was the free Chinese dinner perhaps the determining factor?

"You suddenly find that educational meetings that have been organised for years are suddenly being sponsored by drug companies and you go along and their products are on display and so on"

(GP12;PCT2;M)

"To discuss the new dyspepsia guidelines which we didn't go to because it was supported by the industry. It was sponsored by a drug company, but they set up these sort of meetings and you get a selected population"

(GP23;PCT2;F)

"Personally, I am very unhappy about going to, you know contributing to a meeting, which is, where the sponsor is selling the drug you are prescribing....I think that the PCTs are a bit, a bit lacking in [knowledge] about this; they often get involved with drug companies, to my of thinking in a way that is inappropriate"

(GP1;PCT1;M)

6.3.9.2 Stakeholders’ opinions of commercial influences

As opposed to GPs, stakeholders were united in their views that the pharmaceutical industry influence GPs’ prescribing negatively. Few details were given of how GPs were influenced and in what fora that took place. Possibly, stakeholders had less detailed information than the GPs on where and how commercial entities targeted GPs. One stakeholder that worked in the local hospital said that GPs were easier to target for the pharmaceutical industry than hospital doctors due to stricter control of prescribing in hospitals.
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"I think that the drug companies do target GPs in a slightly more specific way than they do with hospital doctors. In hospitals I think they understand that in a building it is very easy to look and see and check on the influence, whereas if you go to GP practice it is harder."  
(SH3;M)

Stakeholders said that national and local prescribing guidance must be carefully designed so that it could not be used for marketing purposes by the pharmaceutical industry. An MeReC Briefing commented that NICE advice on Cox-II published in 2001 had been sparse in evidence supporting the guideline recommendations (National Prescribing Centre, 2002). The issue also highlighted an ethical problem; if NICE recommends this certain 'new and expensive drug' should the patients still not be given this treatment because it is 'too expensive'? PCTs responsible for containing the prescribing budget may see NICE advice in another light than the prescribing doctor and the patient. In a situation like this, it could be difficult for the PCT to oppose use of this 'new and expensive drug' as the PCT may then be seen as being purely cost-conscious instead of improving the therapy for patients based on evidence. Again, there are different views on what quality of care is and how money should be spent to achieving this quality; is it the highest quality for a 'few' individuals or the highest quality possible for the masses.

"Locally we are not particularly happy with the Cox-2 guidance from NICE, we thought it wasn’t perhaps specific enough. We thought it was potentially being abused by pharmaceutical companies to really push open a door"  
(SH35;PCTX;F)

Some stakeholders thought that messages from the PCTs must reach GPs before the pharmaceutical industry send theirs, in hopes that the PCT message would be the lasting one. It is known that the pharmaceutical industry often raises GPs’ first awareness of a new drug and that first experience is crucial to future usage of a new drug (Jones et al., 2001a). Another stakeholder perceived that the last message given was what determined GPs’ actions.

"A lot of the GPs are very receptive to the pharmaceutical industry, it is not that they are not receptive to what we’re doing but it is just like you know, the last person that gives them a message, whoever that might be."  
(SH35;PCTX;F)

It was recognised and bemoaned that the pharmaceutical industry had much more resources than the NHS and that this made it a losing battle for the PCTs getting their
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messages across to GPs. It is not known whether this argument was real or an excuse for
not getting all GP prescribing in line with recommendations.

“We have got fairly robust systems in place to actually spread messages across but you do feel that you
sort of continuously fighting and losing a bit of... losing a battle against the huge resources of the
pharmaceutical industry”
(SH35;PCTX;F)

“I would prefer it if drug companies had less influence because it just doesn’t really feel very balanced in
terms of the resources they have to spend and just the general sort of approach by getting drugs used in
secondary care and then used in primary care”
(SH27;PCT1;F)

The stakeholder from PCT2 who arranged the industry sponsored meeting said the
approach was a success. Another stakeholder also meant that the involvement with
commercial entities could have advantages while some GPs strongly opposed this as
previously discussed.

“Slightly more controversial, I think the reason that the September meeting worked was because it was
sponsored by industry. And therefore there was a nice big meal for everybody at the end of it, so we
actually engaged people we hadn’t seen at an event before, but there were obviously pros and cons to that;
people might think that you have biased your whatever it is you have produced, by using the industry so
we have to deal with that quite carefully and we have to look at ways to do that a little bit more
transparently in the future... We know that we have got a proportion of GPs who are completely against
and a proportion who are quite happy with it [sponsored events]. I think it is much more about how we do
it to; having a process by which you can register that you are doing something with the industry and it
goes through relevant committees and so it is all “signed and sealed”... and organised.”
(SH21;PCT2;F)

“The industry, as we know, go around and talk to people all the time about the products and the GPs say
“Oh nooo- they don’t influence”, but they do and maybe if the PCTs can work with the industry for their
benefit, you know, if they actively seek out what the company is going to benefit them as well as the GPs
maybe there will be more industry working. I don’t know”
(SH28;PCTX;F)
6.4 DISCUSSION

6.4.1 Discussion of the study design

The aim of this study was to provide deeper explanations about what influences prescribing and why this was so in order to make recommendations for prescribing management. While an atheoretical approach was taken, a theoretical model such as Social Network Theory (Scott, 2000) or Diffusion of Innovation theory (Rosenkopf and Nekar, 1999) could potentially help further explorations and explanations. One-to-one interviews were deemed suitable, as opposed to focus groups as individual views were sought and prescribing was considered a contentious issue (Carthy et al., 2000).

6.4.2 Discussion of the sample

Recruitment of GPs

The results from the study were not generalisable as the sample size was small, representing 7.7% of the GPs in the two PCTs. For a qualitative study the numbers were not small however; samples over 50 are considered large. Bowling (2002) said that appropriate sample size is reached when the same issues, themes, and stories come up. Both GPs and stakeholders were duplicating responses which was evidence that an appropriate sample size had been reached. Again, the purpose of these interviews was not to provide generalisable results but instead to provide explanations of reasons 'why'.

It can be proposed that the participating GP sample was driven by self-development or by thoughts that part taking served the wider health system. The invitation letter (Appendix V) used expressions as 'very valuable' and 'important for shaping future prescribing activities' which are emotive words. Such appeal may have attracted GPs who felt obliged to contribute to the development of health care. In this category there were more women; are they more 'morally' driven or do they simply respond in a more emotional way? A majority of GPs were united in that participation served the development of quality in health care. The letter also said that GPs would be asked to 'evaluate' issues in the interview which may have appealed to the GPs who like to develop themselves or those who have an interest in prescribing issues. Hence, it is possible that the invitation letter affected the types of GPs that decided to participate.
although this was not the purpose. If this was so, the PCTs could potentially use the expressions in the invitation letter to attract this type of GPs. Other arguments and approaches should be explored in order to recruit another sample type. The reasons for participation mentioned by the GPs could give clues of how researchers and PAs should approach GPs in order to arrange a meeting. The saying to ‘know your audience’ sums up how recruitment should be run.

Recruitment of stakeholders
Stakeholders were not asked why they decided to participate in the interview based on the fact that they were purposely selected because they had certain responsibilities for primary care prescribing and thus prescribing management was part of their job description. The fact there was a 100% response rate made question of reason for participation less relevant for sampling purposes. It was expected that the stakeholders’ focus on and support for prescribing issues may have been greater than GPs’.

6.4.3 Implications and recommendations regarding prescribing influence
It seemed that stakeholders’ views converged with GPs’ perceptions of what factors influenced GP prescribing. However, stakeholders’ did not fully express the, sometimes great, difference between two GPs’ perceptions. With awareness of differences between GPs, stakeholders would be better equipped in implementing initiatives; individual targeting of practices may be an effective approach.

Tailoring messages and interventions may however consume additional resources compared to sending one message and launching one intervention. The findings further suggest that not only should messages be tailored, they must also be prompt and repeated, which potentially adds to the resources needed. In addition, Cantrill (2000) recommended that the staff that worked with trying to influence prescribing should have knowledge of the complex decision process that preceded the issuing of a prescription.

Stakeholders’ intentions to drive the prescribing agenda were genuine but the capacity to fully do so was lacking, as judged by the GPs. If PCTs became more acquainted with GPs and were not seen as an external authority, collaborations may improve. With a close relationship between practices and the PCT, problems within practices could be rectified through individual support. In a close relationship the PCT personnel would be
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able to get more detail of GPs' perceptions of prescribing and could gain knowledge in issues around type and amount of information; how much information was 'too' much and what kind of information was sought by GPs. Many of the reasons for a lack of implementation and up-take of initiatives related to a perceived lack of time and manpower. These were mentioned by both GPs and stakeholders.

From these interviews a number of issues emerged which the PCT should work on. One advice was that PCTs should give practices time when no initiatives were running and to advertise this 'vacation' to GPs. In this way, GPs' energy may be rejuvenated and they would be more inspired to take part in new initiatives.

6.4.4 Implications and recommendations regarding organisation and policy

The process of implementing prescribing initiatives to GPs could be analogised by having a group of people to climb a mountain. It would take people different times to reach the top if they were equipped with different abilities and enthusiasms for such an exercise. The quicker climbers would lead the way - and could represent the opinion leaders. The slower climbers may need more help and encouragement not to give up; PAs have here a role to fulfil. The point with this analogy is to recognise that each GP has different abilities and that the support from PCTs should be tailored accordingly.

The findings from the interviews highlighted what was considered important by stakeholders and GPs in driving the agenda for increased quality and effectiveness of prescribing. In general, GPs expressed a good relationship with the PCTs but had different views of the PCT's role. This may explain why the stakeholders found it easy to work with some but not with other practices. The PCTs could potentially appoint the co-operating GPs as opinion leaders to promote the services by the PCT to practices where relationships had been strained; the PAs should take note of GPs views when assessing and communicating their roles.

For full uptake of interventions, barriers to change must be appreciated and disseminated at all levels; national, PCT, practice and at individual GP levels. Barriers to change can be labelled as 'practical' or 'conceptual'. While practical barriers can be measured, assessed, and shortcomings addressed; barriers due to conceptual issues are
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often more difficult to assess and overcome. Qualitative research methods could be used to assess and explain barriers to inform stakeholders on how to guide individual GPs.

Although there were exceptions, the majority of GPs seemed fairly content with the extent of freedom they had to prescribe. Perhaps GPs were satisfied with the shift in power from HAs to PCTs. It seemed from the interviews that, for the most part, the structural changes within the NHS had not threaten GPs as independent prescribers. A review of barriers to clinical audit concluded that professionals thought workload increased and that clinical freedom was restricted (Johnston et al., 2000). Increased workload was recognised by GPs in this thesis but most of them did not feel that interventions restricted their clinical freedom to any large extent. Johnston and colleagues (2000) found that education around audits and the audit itself was at times poorly designed. The intervention was not properly implemented due to poor support from facilitating personnel. With appropriate expertise, PAs can make a difference to how the audit is designed and supported.

According to the interviewees prescribing management could be run through ‘support’ or ‘control’ and most GPs and stakeholders seemed to favour the support approach. Some stakeholders thought however that they were lacking ‘sticks’ to drive the Government’s prescribing agenda towards increased quality. The PCTs are still young organisations and it seemed at times that they were not fully trusted by GPs as an authority.

As well as GPs expressing different trust and support towards the prescribing agenda there was also a discrepancy in stakeholders’ perceptions of how well their own agenda was structured. With increased communication around the agenda of prescribing and a robust structure of the implementation of the initiatives the credence gap could potentially be bridged within and between professions. PCTs could benefit from collaborating with other organisations and groups that were already respected sources of influence.
6.4.5 Implications and recommendations regarding formularies and prescribing incentive schemes

Both GPs and stakeholders expected a change in future prescribing initiatives. New initiatives may be easier to implement if change is expected and thus this was 'good news' for the PCTs. Stakeholders put more hope and reliance on usefulness and utility of local formularies than seemed to be the case, as reported by GPs.

The fact that stakeholders did not agree on the definition and utility of formularies could potentially affect their perceived importance by GPs. In interviews, stakeholders gave a lot of detail about the purpose of the formulary. GPs reported that such detail was lacking. Hence, if the purpose of the formulary was restated, usage by GPs could potentially increase.

While GPs and stakeholders recognised that formularies must not contain too much information, it was not stated how much was 'too much'. This was shown by the response from a GP and a stakeholder working in the same PCT (GP1;PCT1;M) and (SH32;PCT1;F).

"The Pharmaceutical Advisor is still writing chapters and I mean what is happening now is that the effect is that now you are getting things that are almost textbooks for medicine. No one is going to read them! I am afraid and I hate to say that, and I can't bear to tell her really, you know, she would be so upset" (GP1;PCT1;M)

"I think if you try to incorporate too much information in there [local formulary] you lose what you're trying to get to. For example, I'm doing cardiology at the moment, if I tried to include everything, every single cardiology guideline within the cardiology chapter I'm going to be there for ever" (SH32;PCT1;F)

It could also be recommended that PCTs investigated how much is 'too much' information before embarking on updates. Literature reported that guidelines that offer specific behavioural advice on therapies such as 'what, who, when, where and how', are easier to implement (Michie and Johnston, 2004) but it must be assured that incorporation of this level of detail does not make the guideline 'bulkier' as this can potentially decrease usage according to the interviewed GPs.

GPs thought the local formulary was clear to understand. Sparse usage or non-compliance could therefore not be attributed to lack of clarity. While an Internet version
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was deemed to be useful according to GPs, literature showed that computerised based clinical decision systems were little used by doctors (Eccles et al., 2002). The implementation of local formularies should be accompanied by implementation activities like workshops or other educational outreach as suggested by GPs. Stakeholders said that the PCTs had undertaken implementation activities and that the local guidance was available on the Internet. Clearly, GPs’ and stakeholders’ perceptions and knowledge were not assimilated. In order to bridge this gap PCTs could keep a record of which GPs attended the implementation activities such as launches and workshops and thereafter target non-attending practices with the information.

GPs seemed rather unconcerned about whether they had followed the formulary recommendations or not. Stakeholders, one the other hand, thought the process of development was more important than the product itself, which may reflect GPs’ seemingly sparse use. Perhaps the stakeholders had too little dialogue with the GPs or that discussions had ceased and stakeholders were pushing their own agenda without incorporating GPs’ opinions. Lack of resources and too many new imperatives could contribute to a situation of disillusion. It was recommended that the PCTs compared GPs’ prescribing with the formularies and pointed out any discrepancies to GPs. Disclosure of prescribing data has been suggested as one method for promotion of good prescribing but an estimated 75% of the PCTs were not adopting the approach (Audit Commission, 2003).

Drawbacks with the PIS were recognised by both groups; the scheme will probably be redundant with the introduction of the new GMS contract. As was true for the PIS, new GMS targets must not be perverse in order to increase the quality of prescribing.

Opinions were divided between stakeholders and GPs about whether the sums of incentive money were too high or too low, but interestingly the same split was also seen within the groups (figure 6.5). No further investigation was made what characterised people with different opinions but could be interesting for further studies. Aside from these ‘extreme’ views summarised in figure 6.5, stakeholders said that they were not sure whether the sums mattered, as in the end not every practice claimed their money anyway.
For a successful implementation of prescribing interventions, like the PIS, GPs felt that attendance in discussion meetings was essential. Consensus should be reached in those meetings which would generate a feeling of ownership. Increasing ownership was thought to help the process by increasing their enthusiasm to the task. It should be kept in mind that GPs have historically been freed from insight into how they treat their patients and are not used to being controlled centrally. The initiator of the intervention (in many cases the PCT) must also realise the increased workload that the intervention may bring to the practice and be realistic in how much GPs can take on board, or changes will not be implemented (Shekelle, 2002). Increased workload due to interventions should be communicated between the GPs and the PCT.

The WHO (1994) stated that doctors have a personal arsenal of drugs of which they have good knowledge and use on a regular basis. If this personal armoury of drugs could be drawn from the local formulary efforts of changing prescribing could be spared later on. Tentatively, new GPs should be taught about formularies and develop a habit of using them. Teaching practices and where doctors train have an obvious responsibility to teach good practice, the PCTs have an important role to promote the use of formularies and guidelines. Agreement on prescribing issues between the PCTs and teaching practices could facilitate much future work for the PCTs when new generations of prescribers start practicing.

### 6.4.6 Implications and recommendations regarding commercial influences

It was interesting to note that some GPs in the study PCTs saw drug representatives, although the PCTs have never supported this relationship; clearly the PCT recommendation was not taken up by all GPs. Reasons for this may include a desire by these GPs to receive free information and gifts, a perception that drug representatives’
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information is valuable and up-dated, or that they have no knowledge of the PCT recommendations. Thus, the PCT must disseminate their policy wider and possibly enforce it with ‘sticks’ or ‘carrots’.

GPs recognised that doctors deal with commercial influence differently; some doctors saw drug representatives in their practices and listened to their messages. It is of added concern that some of these GPs did not admit to any influence from drug representatives. This suggests that an underestimate of commercial influence could prevail. Literature report that doctors’ prescribing is affected by drug representatives but that this source of influence is disapproved (Abbasi and Smith, 2003). This may be why some GPs in this thesis denied to such influence. As opposed to GPs themselves, stakeholders did not comment on whether there were any differences between GPs in their attitudes towards the pharmaceutical industry.

Again, the PCTs should take a tailored approach to convince these practices not to be in contact with commercial entities. The stakeholders should make sure that at least all GPs know how drug information from the PCT and the industry can be different. Evidence has shown that the pharmaceutical industry engage in selective reporting from their trials when publishing in journals (Melander et al., 2003). Although most GPs probably know this ‘trick’ of the industry; it may help if GPs are continuously alerted of such by the PCT. If PCTs got involved in the evaluation of commercial information, as suggested by one GP, the PAs could demonstrate their knowledge and value to the GPs. The PCT should at the same time offer prescribing advice from non-commercial sources (such as the PAs) in a replacement for any biased sources.

The pharmaceutical industry is profiling doctors in efforts to predict which doctors will be most receptive to their messages. The current method favoured by the industry is to use opinion leaders to bring their message (Jackson, 2001; personal communication, Product Manager at Merck, 18/09/04). In the USA, the Diffusion of Innovation theory in combination with Social Network theory is used for such purposes (Ingram and Roberts, 1999; Rosenkopf and Nekar, 1999). The pharmaceutical industry constructs maps of Social Networks in order to target professionals that are seen as leaders within their sphere. These people could for example be holding an important strategic position on various professional boards and therefore taking a leading role within their
profession. The Diffusion of Innovation theory or Social Network theory both seemed to have potential for further explorations of influence from PAs and commercial entities. The PCT could do similar networks maps in order to select lead professionals as their opinion leaders.

Stakeholders in the interviews felt short-handed when competing with the industry in getting messages through to GPs. The PCTs could benefit from disseminating new information before the industry as it is regarded easier to influence a fresh mind than to change an already formed view. By doing this the PCT may also be viewed as a prompt and updated source.

Alternatively, a partnership between the PCTs and the industry could be the pragmatic way forward; the PCT could 'piggyback' their messages at the expense of the industry, illustrating the saying "if you can't beat them - join them". Educational activities, for example, could be arranged jointly but the PAs must make sure to have the capacity to balance claims from the industry. The PCTs must also be prepared to act in their own interest when there is a conflict of message. The acceptance of this approach must first be thoroughly investigated with doctors before any links with the industry are formed.
6.4.7 Methodological difficulties and limitations

Sample selection
The sample comprised proactive professionals with perhaps stronger desires to share their views than those who chose not to participate in the interviews. These participants may have had more extreme views or a stronger feeling or interest in prescribing issues, though this could not be compared. A plan was drawn up to minimise self-selection bias, whereby those practices that initially said no to participation would be targeted and followed up.

Personnel from both PCTs had commented that some GPs were not taking part in PCT initiatives and others would not let the PAs ‘through the door’ so GPs were to be selected based on participation in the PCT PIS 2002/2003. The rational for this was that non-participation in a PCT initiative may be linked to refusal to partake in PCT activities (the interviews). Invitations to participate in the interviews were sent out on School of Pharmacy letter headed paper and the PCTs provided information on practices not participating in the 2002/2003 PIS. However, only one practice from PCT2 had no legitimate reason for non-participation whilst three practices from PCT1 were labelled “unknown reason for non-participation”. It was then agreed that no further attempts would be made to interview ‘non-participatory’ GPs as the numbers were so small and self selection bias was not considered to be a problem in the participating sample.

Piloting the interview
Ideally the same sample as for the interviews should have been used for piloting. The reason to select another PCT than the study PCTs was not to jeopardise the sample for interview. A similar PCT was chosen so that the fact and content validity could best be tested.

Interview procedure and analysis
As part of the introduction before the interview, the principal investigator (also the interviewer) made it clear that they were not working for the local PCT and that data
would be anonymised. It was clear in the interview that a couple of interviewees had not appreciated that:

"Maybe you come back to me and say some of you have to be corrected so it is like feedback for me and also my feedback on others to see whether I'm telling the right thing or not, so I just wanted to know about what I am doing is right or not, that is the main [reason] that I agreed [to participation]"

(GP4; PCT1; M)

Such a perception may have influenced response; a Hawthorne effect may have affected the response. Perhaps did this GP tailor the response to what was thought to be in the interest of the PCT?
6.5 CONCLUSIONS

The hypothesis that health professionals have different views on what influences prescribing was supported by this study. This was true not only between GPs and stakeholders but also within professions. Full consensus and agreement was considered impossible as explained by one stakeholder:

"I don’t think all participants within the health care system are agreeing on the terms of efficacy and quality etc. We all have our own agenda. It is impossible to set a decision guide so that every interest is satisfied. It is impossible because some of the key players at times go against each other. Therefore, I think there will always be discontent from some or one key player about the NHS system"  
(SH36;PCTX;F)

Many of the breakdowns or insufficiencies between a full collaboration between GPs and stakeholders were said to be due to lack of resources such as time and money. While literature recognises knowledge gaps in how to best implement prescribing initiatives, hands-on expertise may be short in PCTs. Further recommendations to increase impact on prescribing are discussed in chapter seven.

The results from this study will be disseminated to each participant and could potentially be used as examples of communication breakdown, where knowledge of the other side is insufficient. Increased recognition from GPs and stakeholders of difficulties that each group faces could provide greater opportunities to implement the prescribing agenda together.
CHAPTER 7

EXPLAINING INFLUENCES ON PRESCRIBING
7.1 INTRODUCTION

The thesis investigated what factors that influenced primary care prescribing but also explored the reasons for their influence. The studies in this thesis found that GPs' perceptions of what influenced their prescribing differ. Evidence from literature concluded that GPs take influence from a range of factors and that it is therefore more effective to use a range of methods when trying to influence doctors (Oxman et al., 1995; Gill et al., 1999; Mason et al., 2002). It was found in this thesis that perceptions of influence were related to demographics and characteristics of the prescribers and that these qualities were also reflected in prescribing behaviour. A tension between the individual and the organisation was a general feature within prescribing management.

The aim of this chapter was to triangulate the findings from each chapter to inform project recommendations and to fully explore the influences on prescribing, in line with the overall aims of the thesis. This chapter both summarises data presented in previous chapters and discusses the implications of this project (figure 7.1). The pragmatic approach taken throughout the project allowed for recommendations to be made in practice.

Advice on how to increase the impact on prescribing and shape the prescribing initiatives are given based on the findings. The same recommendations are given to
both PCTs as the analyses were done on the combined GP populations and the findings generated no reasons that would disqualify such approach. Requirements for and barriers to success in a real life setting are incorporated in discussions. Further research to extend the knowledge on the topic and limitations of the project are discussed at the end.
7.2 DISCUSSION

7.2.1 The conflict between the individual and the organisation
Change in general is a potential cause of conflict within an organisation. Primary care has undergone extensive change in recent years which was at a peak during the time of this project; Health Authorities (HA) became Strategic Health Authorities (SHA), PCGs were reorganised into PCTs, and the new GMS contract was negotiated. Frustration was commonly expressed in interviews from both stakeholders and GPs as to how current initiatives were run and the uncertainty [yet optimism] of future developments. For the purpose of this discussion, the ‘individual’ does not necessarily refer to a person but can be. The findings demonstrated several interfaces where a conflict could occur between the ‘individual’ and the ‘organisation’.

A formal relationship between GPs and the PCT exists in that the PCT is responsible for allocating GP prescribing budgets and that practices are to be supported and monitored by PAs. In this study, it was found that GPs responded differently towards this relationship. The GPs had different views on what role that the PCT should take; a role of support or control. Some GPs felt unnecessarily controlled in their prescribing practice. Perhaps the reason for this is historical; GPs have never before been as centrally controlled on how they practice and prescribe. Devices for controlling prescribing e.g. formularies have been established longer in hospitals than in primary care (Jones et al, 2001). Jones and colleagues (2001) found that consultants could more readily than GPs report the pathway of influences that affected their prescribing (Jones et al., 2001). Prescribing in primary care has historically escaped scrutiny, but surveillance programmes have now been introduced.

National and local priorities may cause conflict if there are too many things on the table; both GPs and stakeholders felt swamped with performance targets. Likewise, there could be tension at the interface between the PCT, and SHA and strategic policy makers who launch imperatives that the PCT is accountable for. The National Tracker Survey in 1999 revealed that there was a tension between central NHS control and local freedom in developing primary care. The PCTs are a means for putting health
professionals in charge of driving local health care developments, but an increasing amount of central imperatives and performance targets have discounted the initial promotion (Wilkin et al., 2001a). GPs have to negotiate patient demands while at the same time following national and local targets and recommendations. The interview studies in particular, revealed conflicts between the individual and the organisation.

It is the task of the PCT to overcome the variability, fragmentation, and isolation that have previously been the weaknesses of primary care; much of the success depends on the capacity and flexibility of the work force within the PCT (Wilkin et al., 2001b). It has been recognised that PCTs must have the freedom to set the balance between national and local goals and that a heavy-handed central management could suppress local initiatives. Similarly, the concept applies to the relationship with GPs; how much freedom should be given to GPs in their prescribing practice and how should this be managed by the PCTs? Perhaps a relationship could be built between the PCT and GPs by approaching GPs with an honest and firm message that appeals to their needs. If negotiations do not achieve the required results, a more heavy-handed approach may be necessary.

As part of the agreements with the funders, the findings from this thesis will be fed back to the PAs and prescribers in the PCTs to make them reflect upon their performance and to increase prescribers' insights into the prescribing management process. Knowledge about attitudes towards current prescribing initiatives may help stakeholders to agree future prescribing programmes with GPs. The GPs recognised that they were a difficult audience to influence and that habit guided practice;

"What influences prescribing is difficult to change. You know the source of information that we draw on, our influence, on prescribing, I think err... is quite hard to change and I would find it very hard to look at MIMS when I spent all my career looking at the BNF you know, it's just I am not in a habit of reaching this [the formulary] and open it"

(GP66;C3.1;PCT1;M)

PCTs should incorporate more rigour into their prescribing management; they should self-monitor in order to evaluate their effect on prescribers. One stakeholder gave evidence that satisfactory procedures of self-monitoring were not yet incorporated:
"You can’t tell whether you were the cause of that change, or whether other influences were the cause of that change”
(SH31;PCTX;F)

The PCTs need to keep records of which practices and GPs take part in PCT prescribing initiatives. Stakeholders found it difficult to implement new initiatives and felt they had to compete for GPs’ attention. Using several ways to communicate was still not enough as described by one stakeholder:

"It is very difficult to get messages across so you just have to try and use several different ways whether it is, you know an e-mail, a letter, GP forum and you will still have people I’m sure in six months, saying ‘What formulary? I didn’t know we had a formulary.’"  
(SH35;PCTX;F)

7.2.2 Considerations and recommendations to PCTs

A Cochrane review stated that “there is currently no base of evidence that can guarantee that an intervention or package of interventions will work” (Hulscher et al., 2002). It was suggested that using multifaceted interventions were more likely to achieve change. The success of an intervention was dependent on the barriers of the particular intervention. Therefore, it is essential to investigate what barriers may affect each intervention. The more barriers to change that are addressed the greater the likelihood that the intervention would work. From this evidence it can be concluded that changing prescribing needs extensive resources; why otherwise would the pharmaceutical industry spend so much on marketing and sales activities? The findings from the cluster analysis support a move away from the ‘one size fits all’-philosophy in terms of prescribing management.

Findings in this thesis suggested that it was possible to cluster GPs according to their perceptions of what influences prescribing. The clusters were distinctly different in terms of demographics and characteristics of practices that the GPs worked in. The clusters also differed in prescribing behaviour. As findings suggested that GPs are different in terms of perceptions of prescribing influence and prescribing behaviour such differences should be incorporated into management by targeting GPs with
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tailored support. Depending on resources, PAs may do this on a practice or individual GP level.

A ‘To do list’ was constructed for PAs and based on evidence presented in the thesis. It was however not within the remit of this thesis to investigate whether and to what degree the PCT had resources to undertake suggestions. Points in the list are commented on below.

To do list for PCTs:

☐ Make the change agenda clear to GPs so that common goals can be set
☐ Increase communication and build continuous relationships with practices
☐ Compile, condense and disseminate relevant information on prescribing to GPs
☐ Work up the reputation as a trusted and respectable source of information
☐ Build links with already trusted and respectable sources such as clinical effectiveness groups
☐ Make sure to agree the role of the PCT amongst PAs and GPs and work according to that
☐ Recognise differences between GPs
☐ Recognise differences between GPs and stakeholders and open up as a subject for discussion
☐ Build links with secondary care so that prescribing is smooth at the interface
☐ Increase involvement of GPs in the PCT
☐ Assess compliance with formularies and feedback results to each practice directly
☐ Update the formulary quicker
☐ Tailor interventions to GPs

As the GPs are now part of the PCT they should feel like members of the organisation; communication between the parties must be honest and transparent. The GP profession has always been involved in health politics and any ‘hidden agendas’ are unlikely to pass them by. To meet GPs demands evidence based information should be compiled and condensed and forwarded to GPs. The PCTs should, in order to increase their reputation as a source for information and support, link up with reputable organisations as suggested in the interviews. The PCTs should mediate in the gap between primary and secondary care prescribing, and balance messages from the pharmaceutical industry. The ‘To do list’ contain issues that would aid in refining and demonstrating the roles of PAs. The interviews showed that the PA role is not established in comparison to that of a practice nurse’s or a GP’s. PAs should show GPs that they are
taking an active role in supporting and monitoring prescribing and must therefore be
sure to continuously communicate with GPs. Work commissioned by the Department
of Health (All Party Parliamentary Group, 2002; NHS Confederation, 2001) reported
that the PCTs were badly equipped in terms of staff resources to undertake changes as
proposed by the NHS agenda. The proposed ‘To-do-list’ may therefore be a challenge.

GPs have different opinions of how to run prescribing initiatives within the PCT; for
example some GPs prefer repeating the same audits every year whereas others think it
is no point doing things ‘over and over again’. A pragmatic way in which this could be
individualised to GPs would be to include both new and old audits so that the GPs
could choose their approach. PAs must show that they recognise the differences of
opinions and capacity between GPs and tailor to individual needs. While allowing for
such flexibility, the PCT must ensure that they maintain their strategy to meet their own
needs. In order to increase GPs’ ownership of interventions the PCTs could assign
responsibility of different prescribing areas to groups of GPs and empower them to
participate in the feedback processes. Feedback and closeness of working relationships
between the PAs and the GPs could also be improved via the PACT Standard Reports.
A study concluded that GPs needed and wanted help to interpret their prescribing data
in the PACT Standard Report (Jones et al., 2002). PAs could learn about GPs’ opinions
of local formularies from the summary in chapter six.

Figure 7.2 proposes a conceptual model of factors influencing prescribing that were
drawn from evidence in the studies. As previously stated, it is not certain that
perceptions steer actions of prescribing and and the thesis makes no claims to have
identified all potential factors that may influence prescribing behaviour. In the cluster
analysis relationships were established between GP perceptions, demographics,
characteristics and prescribing behaviour, but as previously discussed this could be
further complex by unknown factors and confounders. These reservations did not
discount what was found in the studies, and nor did they affect the practical use of the
findings. From the studies it can be concluded that tailoring prescribing messages to
practices may be of benefit as GPs do not perceive themselves to respond to the same
Explaining influences on prescribing
cues. This again suggests that ‘one size fits all’ initiatives may achieve little. The next section gives further detail on how to tailor prescribing messages.

![Flowchart showing input and output](image)

**Input**
- GP knowledge
- Patient
- Demographics

**Characteristics**
- Perception
- Practice culture
- PCT culture

**Output**
- Prescribing initiatives

Figure 7.2 The conceptual model of prescribing influence

### 7.2.2.1 Tailoring messages to clusters

Targeting and tailoring strategies are used widely within society; it is of essence in marketing. A teacher constantly needs to adapt learning styles to pupils with different abilities in order to achieve learning throughout the whole class. Similarly, unless a message is relevant and suited to a GP’s need it may not be incorporated into practice. The PCT should develop messages of different amount of detail in order to ensure progress of GPs that are on different levels and have different interest in prescribing. This suggestion is backed by some GPs’ demand for more detailed information and by the GPs that said that they received too much information. Attempts to label the GPs in the different clusters were founded in study results and collated in the analysis and write up stages and should be pondered when shaping tailored interventions (table 7.1).

<table>
<thead>
<tr>
<th>Cluster 1 and 1.1</th>
<th>Cluster 2 and 2.1</th>
<th>Cluster 3 and 3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservative</td>
<td>Confident</td>
<td>Change-overt</td>
</tr>
<tr>
<td>Hierarchical</td>
<td>Individualistic</td>
<td>Compliant</td>
</tr>
<tr>
<td>Non-compliant</td>
<td>Self-contained</td>
<td>Co-operative</td>
</tr>
<tr>
<td>Pragmatic</td>
<td>Unconnected</td>
<td>Realistic</td>
</tr>
<tr>
<td>Traditional</td>
<td>Unconventional</td>
<td>Reflective</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Team-player</td>
</tr>
</tbody>
</table>
Explaining influences on prescribing

It seemed from the validation interviews (chapter four) that GPs' perceptions were related to the culture of the practice. Some practices had formal policies around (against) commercial interaction and in other practices peer discussions were incorporated into work schedules. According to a hypothesis adopted from Jones and colleagues (2001) different cultures within practices gave rise to different prescribing behaviour. If this is true, it means that PAs have to change the culture in practices in order to change prescribing behaviour.

Tailoring prescribing messages to GPs requires resourceful and creative staff who are able to adjust to different practices and can manage a flexible approach while retaining the aims of the PCT. PAs should approach GPs with arguments that were shared across clusters such that prescribing is a complex issue, and different GPs prescribe differently for several reasons but often familiarity, experience and preference contributes to drug choices. The prescribing message should then be put forward by different methods to different types of GPs while retaining the same content [possibly with different amount of detail] in order to be absorbed by GPs in different clusters. For example, GPs in cluster 1 and 1.1 could be targeted via consultants or specialists as they seemed to be comfortable with traditional communication pathways and were not adverse towards hierarchies. The PCT could form links with such spokespersons in a local hospital who could bring messages to these GPs. Messages could also be brought via the pharmaceutical industry if this was first agreed with PCTs. These GPs could potentially be convinced to attend meetings arranged by the PCTs that provided some form of hospitality that is commonly supplied by the industry. In the process, the PAs could gradually educate these GPs about the insufficiency of commercial information and as such replace commercial entities with themselves. As GPs in cluster 1 and 1.1 did not have much contact with other GPs, peer pressure may be ineffective.

In contrast, GPs in cluster 2 and 2.1 had frequent contact with peers which meant that peer comparisons would be an effective way to influence these GPs. GPs in cluster 2 and 2.1 seemed not overly impressed by the work of PAs and had had little contact with them which suggested that this method of communication may be less effective unless efforts are first targeted on changing these perceptions. These GPs regarded education
Explaining influences on prescribing

and peer interaction as a foundation for good care: perhaps these GPs could themselves be opinion leaders appointed by the PCT. The variability of prescribing in this cluster should first be explored and used to develop and target interventions.

GPs in cluster 3 seemed to have an established relationship with the PCT and were inviting their advice. PAs should continue to work closely with these GPs. Potentially, GPs from these practices could be linked up with a practice from clusters 1 or 2 or act as a spokesperson for the PCT. These practices had a prescribing profile that was in line with local and national imperatives and did not see drug representatives by choice. In a few years time the PCTs may need to perform the cluster analysis again to establish whether cluster compositions had changed or whether influencing factors were so different that the cluster items no longer dispersed the GPs.

It should be mentioned that targeting GPs with interventions can be costly, but such an exercise may in actual fact be cost-saving. The cost-effectiveness of individual targeting should be compared to the cost-effectiveness of a 'one size fits all' approach. Perhaps more is achieved in terms of quality and cost of prescribing with individually tailored messages? This consideration must also include where the optimal balance between cost and quality lies. The more that is known about what influences prescribing, the more effective prescribing interventions can be implemented to provide good quality prescribing of drugs.

7.2.3 Methodological difficulties and limitations

This section provides an overview of major methodological difficulties and limitations encountered in the project. None of the methodological difficulties or limitations were thought to have discounted the results as presented in the thesis.

7.2.3.1 Samples

No detail was acquired about the 32% of GPs that did not respond to the first survey; would these people form a cluster of their own? To answer this further studies are required. The response to the questionnaire was satisfactory (68%) which is deemed 'good' in research terms. Of the responding GPs 78% were clustered.
The findings from the interviews may have been skewed as no follow-up of non-participants were made. It could be anticipated that some of the GPs who self-selected to the studies were more proactive and held stronger desires to share their views than those who declined participation. Such bias can only be speculated upon until follow-up of non-participants is undertaken. Findings from the interviews however, corresponded well with perceptions in clusters based on questionnaires where the response rate was good.

7.2.3.2 The survey study

The fact that the respondents to the first questionnaire could choose to be anonymous had consequences when analysing prescribing trends of clusters; for example, the whole practice may have been allocated to a cluster based on the response from one GP. The relationship between individual cluster and allocation of practice could have been assessed if the repeated survey had resulted in a higher response rate. The finding that most practices contained GPs that belonged to the same cluster supported the approach for cluster allocation of practices (see section 5.2.3.3). This sub-optimal method for cluster allocations still separated clusters as was shown in analyses of prescribing trends in chapter five.

7.2.3.3 Prescribing activity data

The data retrieved from the study PCTs (e.g. prescribing activity data, the PIS results or personnel employed in the PCT management posts) were not checked for accuracy, instead were reviewed on trust. It would have required additional resources and time and the investigator would still have had limited access to control and check the data. No consideration was taken to whether there was a time lag of the uptake of interventions when analysing prescribing trends or if interventions were appropriate in the first place, which would require further investigations.

7.2.3.4 Prescribing analysis and cost data

From a researcher’s point of view it would be advantageous if the PACT data had not disappeared after three years but instead was continuously added to the database. This would provide greater flexibility for research when selecting prescribing indicators and
benefit certain statistical analysis such as time series analysis where a larger number of data points provide greater robustness of findings. This type of methodological difficulty is a common, yet problematic, issue when using health service data for research.

There were practical difficulties associated with the collection of prescribing data from the PACT database, such as system over-load and breakdowns. Furthermore, each PCT only had two accounts for login at each time and priority was given to the pharmaceutical advisors. An Internet log-in would increase accessibility to the system but security of the ePACT system would need to be guaranteed before this could be implemented.

7.2.3.5 Generalisability
The results from the project may not be generalisable to PCTs with a different patient population and GP profile. A repeated study including a larger sample of PCTs representing each ‘type’ of PCT in the UK would enhance generalisability. ‘Type’ of PCT includes differences in location, practices sizes, patient populations, and characteristics of the GPs.
7.2.4 Practice research: comment

The design of the project could have been more explicit from the start. A clear structure helps the selection and preparation of suitable methods. Perhaps this contributed to the 'gap' between the academic researchers and the practice personnel in the PCTs (figure 7.3). The gap was present throughout the project but varied in intensity. At times this gap displayed itself as dissatisfaction with project priorities from PCT personnel, an unwillingness to contribute data and a lack of consistent communication between parties. Potential reasons included unvoiced expectations, misunderstandings, hierarchy, and a lack of understanding on both sides. Such experiences are all too common within health services research and a Nuffield report in 2003 showed that dissatisfaction is widespread; everyone involved in health services research was dissatisfied with the process (Dash et al., 2003). The gap could potentially be avoided by agreeing a tighter project plan and agreeing expectations at start of the project. Practice personnel need research in order to incorporate new evidence for improved care and without practice involvement no practice research could be undertaken: cooperation should therefore drive both parties. The next section makes suggestions of extensions to the research presented in this thesis.

![Figure 7.3 The gap between practice and research](image)

7.2.4.1 Further research

Additional experiments and research projects would further benefit these findings, expand on the knowledge of what influences prescribing in primary care and how are GPs different in this respect, for example:
The stability of clusters should be investigated by doing a long term follow up to see if GPs fall into the same clusters over time. Would cluster 3 GPs respond as cluster 1 GPs when older or would cluster 3 GPs remain? GPs may change as to where they take influence from and thus their cluster allocation may alter accordingly. Alternatively, cluster attributes may change altogether so that, for example, commercial influence is no longer an important distinguishing factor between clusters in case the PCT starts collaborations with the industry.

The effect of local initiatives on prescribing could be tested by keeping a firm and extensive log of the details around the interventions. PAs should record which practices took part in initiatives launched by the PCT. The recoded data could thereafter be linked to prescribing trends and effect of initiatives evaluated with intervention analysis. The tool could be developed by the PPA with a link to the PACT database. Within this scheme, GPs could be sent a Delphi questionnaire to prioritise what interventions they would like to see. Prescribing trends should again be investigated after undertaking the prioritised interventions. Such an approach would also provide feedback to the prescribing teams around which of their activities had an impact on prescribing. It may also be worthwhile on a financial level to see which attempts gave a fruitful outcome to get the grips with cost-effectiveness of interventions.

Approximate costs of interventions could be calculated based on initiators’ and participants’ time spent on the interventions; the cost data could be linked to prescribing trends. By evaluating changes in prescribing initiatives could be priced. In a review by Tully and Seston (2000) a positive cost-benefit and cost-effectiveness profile was concluded when pharmacists were working with primary care prescribing monitoring and review. Time lag effects of interventions could be tracked with the prescribing data for more accurate estimations of when to expect changes in prescribing. Such investigation could be set up as intervention studies with a case-control group for generalisability purposes.

Prescribing trends could also be forecasted using Box Jenkins, exponential smoothing or regression techniques in order to predict and estimate what support and prescribing
advice would be needed in the future. Such forecasting systems could be of benefit when setting prescribing budgets in the future but use of such techniques was beyond the scope of this study.

No investigation was made into the appropriateness of prescribing in different clusters as there were no facilities for such analysis at the time. Potentially, GP demographics and characteristics could be added to the General Practice Research Database (GPRD) and PACT data thereafter be linked to doctors who share patient data in the GPRD in order to investigate appropriateness of prescribed drugs for specific patients. The GPRD database contains details of patient demographics, diagnosis and received prescriptions.

No funds had been reserved for implementing the findings of this project which was indeed unfortunate, especially as it is known that words on paper seldom lead directly to change (Smith, 2004). This statement was made by the former Editor of the BMJ in his last editorial. Whether this was an outburst of provocation, resentment or pure realism is not known. The investigator is inclined to suggest that for practice research to benefit practice, resources for a thorough implementation process must be provided.
7.3 CONCLUSIONS

The project took a pragmatic approach investigating influences on prescribing in primary care; data came from many sources used in practice and methods were adapted throughout. The two main aims of this thesis were fulfilled: influences on prescribing within primary care were investigated by describing and relating perceptions of prescribing, prescribing trends and prescribing policy. Recommendations to practice were made throughout the thesis and advice was summarised in this chapter.

The hypotheses of the thesis were supported through the findings. It was shown that GPs’ perceptions of prescribing related to their characteristics and prescribing behaviours (chapters four and five). The relationships between prescribing trends and the incentives and activities promoted by the PCTs varied in clusters (chapter five). Health professionals, both within and between professions, differed in their perceptions of influences on prescribing and had different opinions of and expectations on local and national initiatives (chapter six). The six items used for clustering were found to be appropriate for the purpose stated in this thesis and the clusters proved valid through follow-up interviews. The cluster model was however not tested in other environments and populations may therefore not be generalisable. By using the different methods to explain perceptions on prescribing and prescribing behaviour, the credibility of the project was enhanced.

Combined data from the studies in this thesis gave rise to increased knowledge of what influences GPs’ prescribing and why. The findings suggested that GPs in different clusters should be targeted differently with prescribing initiatives. It was proposed that this project could impact on how prescribing activities within the PCT are shaped and disseminated, to be helpful when targeting GPs with prescribing advice. Implementation of findings was however not part of the thesis. The project provided new knowledge for policy as well as practice. Interviewed GPs and stakeholders expected prescribing influences and attitudes towards these to change over time which demonstrated the importance to continuously evaluate and monitor prescribing behaviour and influences. It was expected that influencing prescribing will remain a difficult task to comprehend.
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Northern Ireland Executive Homepage [www.nics.gov.uk](http://www.nics.gov.uk) accessed 15/05/04

NPC Homepage [www.npc.co.uk](http://www.npc.co.uk) accessed 18/01/02.


*Public Health Profile [PCT1] (2001)* XX London Health Authority.

*Public Health Profile [PCT2] (2001)* XX London Health Authority.

Prescribing Pricing Authority Homepage
[Http://www. ppa.org.uk/help/toolkit/pre-meas.htm](http://www.ppa.org.uk/help/toolkit/pre-meas.htm) accessed 02/11/01 and 16/06/04


Prescribing Support Unit Homepage [www.psu.co.uk](http://www.psu.co.uk) accessed 18/01/02 and 14/10/03.


Royal Pharmaceutical Society of Great Britain Homepage [www.rpsgb.org.uk](http://www.rpsgb.org.uk) accessed 03/04/05.


SPSS 12.0.1, 2004 Programme Help Pages


The Guardian, Homepage
accessed 20/06/03


WISDOM Centre Homepage [www.wisdomnet.co.uk](http://www.wisdomnet.co.uk) accessed 19/06/03 and 08/05/03


WISDOM Centre Homepage [www.wisdomnet.co.uk](http://www.wisdomnet.co.uk) accessed 19/06/03 and 08/05/03


Appendix I: First questionnaire (chapter 4)

Questionnaire to assess prescriber’s views on the “[PCT1] and [XX] Hospital Formulary” and the factors that influence prescribing

In order for us to explore factors influencing prescribing, we ask you to complete the questions below. We estimate this will take you 4 minutes.

Thank you very much for your participation.

Gender □ Male □ Female

Practice □ Single-handed □ Double-handed □ Small practice □ Group practice □ Other .................................................................

Is your practice a teaching practice? □ Yes □ No

Name of practice (optional) ...........................................................................

Number of supporting staff excluding yourself and other GPs.

Non-clinical................................. (whole time equivalents)

Clinical................................. (whole time equivalents)

Year of qualification ......................

Length of time practising as a GP (years) ...................................................

Length of time in this locality (years) .........................................................

Specialist interest/ Further education, please describe

........................................................................................................

........................................................................................................

........................................................................................................
The following scale is the main scale used in the questionnaire; strongly disagree (SD), disagree (D), neither disagree nor agree (N), agree (A), strongly agree (SA).

<table>
<thead>
<tr>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
</table>

These questions ask about things that may influence your prescribing. Please, tick the box that represents your agreement with the statement.

S1
Length of time for consultation influences my prescribing

S2
Timing of consultation (e.g. Friday evening, Monday morning) influences my prescribing

S3
Patient expectations influences my prescribing (Do you feel that patients expect you writing them a prescription?)

S4
The fact that the patient has previously been prescribed this medicine influences my prescribing

S5
The fact that the drug was recommended by a specialist influences my prescribing

S6
The fact that I have previously prescribed this medicine influences my prescribing

S7
Discussing prescribing issues with peers influences my prescribing

S8
Visits by PCT/HA Pharmaceutical Advisers influence my prescribing

S9
Visits from drug representatives influence my prescribing

S10
Internet information influences my prescribing

S11
Advertising in journals and magazines influences my prescribing

S12
Articles I read in journals influence my prescribing
Appendix I: First questionnaire (chapter 4)

S13
National guidelines influence my prescribing

☐ ☐ ☐ ☐ ☐

S14
Local guidelines influence my prescribing

☐ ☐ ☐ ☐ ☐

S15
Prescription charges influence my prescribing

☐ ☐ ☐ ☐ ☐

S16
Other issues that influence my prescribing, please mention,

The local formulary; "[PCT] and [XX] Hospital NHS Trust Formulary"

F1
I find the local formulary user-friendly

☐ ☐ ☐ ☐ ☐

F4
I need more knowledge to use the formulary to the full

☐ ☐ ☐ ☐ ☐

F5
I tend to comply with the recommendations in the local formulary

☐ ☐ ☐ ☐ ☐

F6
The local formulary demands that I change my existing prescribing practice

☐ ☐ ☐ ☐ ☐

F7
Using the local formulary is impractical

☐ ☐ ☐ ☐ ☐

F8, F8 com
In general, do you agree with the advice in the local formulary? □ Yes □ No

F9, F9 com
Were you involved in the development of the local formulary? □ Yes □ No
If yes, how? .................................................................................................................................

F10, F10 com
Do you feel that local formularies are necessary for cost effective prescribing? □ Yes □ No

(feel free to expand) ...................................................................................................................
F11, F11 com
Do you feel that local formularies are necessary for good prescribing
(\textit{feel free to expand}) .................................................................
............................................................................................

F12
How often do you look in the local formulary? \textit{(please, tick one)}
\begin{itemize}
  \item [\square] Daily
  \item [\square] Weekly
  \item [\square] Monthly
  \item [\square] Less than monthly
\end{itemize}

F13
How often do PCT/HA Pharmaceutical Advisers visit you?
\begin{itemize}
  \item [\square] Once every 3 months or more often
  \item [\square] Less than every 3 months but more than once per year
  \item [\square] Once per year
  \item [\square] Less than yearly
\end{itemize}

F14
How often do Drug Representatives visit you?
\begin{itemize}
  \item [\square] Once every 3 months or more often
  \item [\square] Less than every 3 months but more than once per year
  \item [\square] Once per year
  \item [\square] Less than yearly
\end{itemize}

Thanks very much for your participation!

If you have any queries or would like to have more information about the project or the questionnaire, please do not hesitate to contact me, Kristina Astrom on 020 7753 5847 or astrom@ulsop.ac.uk.

Return address as on the envelope:

Kristina Astrom
Research Pharmacist
Centre for Practice and Policy
The School of Pharmacy
University of London
29 -39 Brunswick Square
London WC1N 1AX
Appendix I: First questionnaire (chapter 4)

In order for us to explore factors influencing prescribing, we ask you to complete the questions below. We estimate this will take you 4 minutes.

Thank you very much for your participation.

Gender

- Male
- Female

Size of practice

- Single-handed
- Double-handed
- Small practice
- Group practice
- Teaching practice
- Other

Name of practice (optional) .................................................................

Number of supporting staff excluding yourself and other GPs.

- Non-clinical ............................................ (whole time equivalents)
- Clinical ................................................. (whole time equivalents)

Year of qualification .........................

Length of time practising as a GP (years) ......................

Length of time in this locality (years) .........................

Specialist interest/ Further education, please describe

..................................................................................
..................................................................................
..................................................................................
Appendix 1: First questionnaire (chapter 4)

The following scale is the main scale used in the questionnaire; strongly disagree (SD), disagree (D), neither disagree nor agree (N), agree (A), strongly agree (SA).

<table>
<thead>
<tr>
<th></th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

These questions ask about things that may influence your prescribing. Please, tick the box that represents your agreement with the statement.

S1  
Length of time for consultation influences my prescribing

S2  
Timing of consultation (e.g. Friday evening, Monday morning) influences my prescribing

S3  
Patient expectations influences my prescribing  
(Do you feel that patients expect you writing them a prescription?)

S4  
The fact that the patient has previously been prescribed this medicine influences my prescribing

S6  
The fact that I have previously prescribed this medicine influences my prescribing

S7  
Discussing prescribing issues with peers influences my prescribing

S8  
Visits by NHS pharmacy advisors influences my prescribing

S9  
Visits from drug representatives influences my prescribing

S10  
Internet information influences my prescribing

S11  
Advertising in journals and magazines influences my prescribing

S13  
National guidelines influences my prescribing

S14  
Local guidelines influences my prescribing

S15  
Prescription charges influence my prescribing
The local formulary; ‘PCT2 guide to prescribing’

F1
The local formulary is user-friendly (paper version)
SD D N A SA
☐ ☐ ☐ ☐ ☐
F2
The local formulary is user-friendly (Internet version)
SD D N A SA
☐ ☐ ☐ ☐ ☐
F3
The electronic version of the local formulary is more convenient for me to use than the paper version
SD D N A SA
☐ ☐ ☐ ☐ ☐
F4
I need more knowledge to use the formulary to the full
SD D N A SA
☐ ☐ ☐ ☐ ☐
F5
I tend to comply with the recommendations in the local formulary
SD D N A SA
☐ ☐ ☐ ☐ ☐
F6
The local formulary demands that I change my existing prescribing practice
SD D N A SA
☐ ☐ ☐ ☐ ☐
F7
Using the local formulary is impractical
SD D N A SA
☐ ☐ ☐ ☐ ☐
F8, F8 com
In general, do you agree with the advice in the local formulary? ☐Yes (feel free to expand) ...................................................... ☐ No
F9, F9 com
Were you involved in the development of the local formulary? ☐ Yes If yes, how?................................................................. ☐ No
F10, F10 com
Do you feel that local formularies are necessary for cost effective prescribing? ☐ Yes (feel free to expand) ..................................................... ☐ No
F11, F11 com
Do you feel that local formularies are necessary for good prescribing (feel free to expand) .......................................................... ☐ Yes ☐ No
Appendix I: First questionnaire (chapter 4)

F12
How often do you look in the local formulary? (please, tick one)
- Daily
- Weekly
- Monthly
- Less than monthly

F13
How often do NHS pharmacy advisors visit you?
- Once every 3 months or more often
- Less than every 3 months but more than once per year
- Once per year
- Less than yearly

F14
How often do drug representatives visit you?
- Once every 3 months or more often
- Less than every 3 months but more than once per year
- Once per year
- Less than yearly

Thanks very much for your participation!

If you have any queries or would like to have more information about the project or the questionnaire, please do not hesitate to contact me, Kristina Astrom on 020 7753 5847 or astrom@ulsop.ac.uk.
Dear prescriber,

**Participation in questionnaire and interview – Validating prescribing habits**

We are currently doing a project on GP prescribing habits in the East End. We would like to ask you to complete the questions below. We estimate this will take you 2 minutes.

Name of prescriber ........................................................................................................

Name of practice ........................................................................................................

Please tick the box that represents your agreement with the statement.

| Strongly disagree (SD), disagree (D), neither disagree nor agree (N), agree (A), strongly agree (SA) |

Q1. Discussing prescribing issues with peers influences my prescribing

SD □  D □  N □  A □  SA □

Q2. Visits by PCT/HA Pharmaceutical Advisers influence my prescribing

SD □  D □  N □  A □  SA □

Q3. Visits from drug representatives influence my prescribing

SD □  D □  N □  A □  SA □

Q4. How often do you look in the local formulary?

Daily □  Weekly □  Monthly □  Less than monthly □

Q5. How often do PCT/HA Pharmaceutical Advisers visit you?

□ Once every 3 months or more
□ Less than every 3 months but more than once per year
□ Once per year
□ Less than yearly

Q6. How often do Drug Representatives visit you?

□ Once every 3 months or more
□ Less than every 3 months but more than once per year
□ Once per year
□ Less than yearly
A further interview may be conducted and it will take about 30 minutes. Would you like to participate, please tick:

☐ Yes, I would like to participate (please give your contact detail and I will contact you for a convenient time to meet)

Telephone No.......................................................

☐ No, I do not want to participate because
........................................................................................................
........................................................................................................

Thank you very much for your participation.
Yours sincerely,

Carrie Fung

Please return this letter using the envelope provided or via email to carriefung@lycos.co.uk:

Carrie Fung
The School of Pharmacy
University of London
29-39 Brunswick Square
London
WC1N 1AZ
Appendix III: Interview schedule (chapter 4)

Influences of prescribing

Q1.
Do you discuss prescribing issues with peers? If no-why?
   Who are these “peers” – fellow GPs/consultants/practice nurses…?
   What is the reason you discuss with peers?
   Often?
   In what circumstances do you discuss prescribing issues with peers?

   Do peers influence your prescribing? If no-why?
   To what extent?
   Please tell me a bit more...How do your peers influence your prescribing?

   In general, is peer influence positive or negative thing? (Are you for or against?)

   How can peer influence increase between colleagues?
   How can peer influence be promoted?

   Can you provide an example where a peer has influenced you in your prescribing?
   Or where they could have influenced you in your prescribing?

Q2.
Do you receive visits from Pharmaceutical Advisors (from the PCT)? Often?

   What do you think is the reason for their visits?

   Do you discuss prescribing issues with Pharmaceutical advisors?
   Reasons why/why not?
   Often?
   In what circumstance do you discuss issues with PAs?

   Do they influence your prescribing? If no- why?
   To what extent?
   tell me a bit more...How do the PAs influence your prescribing?

   In general, is PA influence a positive or negative thing? (Are you for or against?)

   How can influence from PAs increase?
   How can PA influence be promoted?

   Would there be any benefit in having more visits from PAs?

   Can you provide an example where a PA has influenced you in your prescribing?
   Or where they could have influenced you in your prescribing?

   Apart from PAs, does the PCT influence your prescribing in any way?
Appendix III: Interview schedule (chapter 4)

Q3.
Do drug representatives visit you? If no- why?
   Often?

Do you discuss prescribing issues with drug reps outside the practice?
   What issues do you discuss with drug reps?

Do drug representatives influence your prescribing? If no- why?
   To what extent?
   Tell me a bit more…How do they influence you?

In general, is drug rep influence a positive or negative thing? (Are you for or against?)

Some practices/surgeries have a policy that does not allow their GPs to see drug reps, what do you think about this?

Can you provide an example where a drug rep has influenced you in your prescribing?
Or where they could have influenced you in your prescribing?

Q4.
How often do you use the local formulary/guideline?

What do you think of as the local f/g? The practice or the PCT one?

Does it influence your prescribing? If no- why?
   tell me a bit more…How does it influence you?
   More influence in certain clinical areas more than other?

Is the local formulary/guideline providing guidance for cost effective prescribing?
Reasons why? In what way do they make prescribing cost effective?

Is the local formulary/guideline providing guidance for good quality prescribing?
Reasons why? In what way do they make prescribing cost good quality?

Is there any room for improvement of the local formulary/guideline?

Can you provide an example where local guidelines/formularies have influenced your prescribing?

Q5
In your opinion what causes GPs to prescribe differently?

Closure:
Do you have any additions to the issues we have been discussing?
And finally, if I could ask you to fill out these 6 questions again, as part of the reliability and validity evaluations of the questionnaire.

Thank you for your time and contribution to the project!
PCT1 Local formulary: [PCT1] and [XX] Hospital Formulary
PCT2 Local guideline: [PCT2] guide to prescribing

XII
Appendix IV: Letter for collection of prescribing activity data (chapter 5)

Time line

Please fill in any events (=initiatives, incentives, publications, activities) that you think may have influenced prescribing in any direction. It can be an internal or external event. Kristina will analyse these events one by one and fit them to the ePACT data to see whether there are obvious shifts in prescribing and if they can be explained by certain events.

Name of activity is what it says e.g. name of document, meeting, official name preferred to internal and abbreviated name.

Type of activity is if it is a document (internal or external), meeting, conference, launch of Internet site etc. Please, let me know if you need further clarification.

There are four pages to the document; one for each year of 1999, 2000, 2001 and 2002.

I will need the filled out Time Lines back by the 18th of March to start collecting the documents.

Many thanks for you help!
Kristina

An example:

<table>
<thead>
<tr>
<th>2000</th>
<th>Name of event</th>
<th>Type of event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>Meeting with GPs launching the formulary</td>
<td>Meeting</td>
</tr>
<tr>
<td>Feb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar</td>
<td>NICE PPI guidelines (will be reviewed in Jun 2003)</td>
<td>Guideline, doc</td>
</tr>
<tr>
<td>Apr</td>
<td>Local development scheme TH PCTs</td>
<td>Document</td>
</tr>
<tr>
<td>May</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jun</td>
<td>PCG-PCT doc C&amp;H, Proposal to become PCT (TH)</td>
<td>Document</td>
</tr>
<tr>
<td>Jul</td>
<td>IS Prescribing launched in C&amp;H</td>
<td>Incentive doc</td>
</tr>
<tr>
<td>Aug</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep</td>
<td>Pharmaceutical outreach,</td>
<td>Intervention</td>
</tr>
<tr>
<td>Oct</td>
<td>Pharmaceutical outreach</td>
<td>Intervention</td>
</tr>
<tr>
<td>Nov</td>
<td>Pharmaceutical outreach</td>
<td>Intervention</td>
</tr>
<tr>
<td>Dec</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
London 17th July 2002

Dear prescriber

Re: Participation in interview “What influences prescribing”

We are conducting a study looking at influences on prescribing over two years run by the [PCT1] and [PCT2] and evaluated by the Academic Department of Pharmacy at Barts & the London NHS Trust.

As you recall, a questionnaire assessing prescribing influences was sent out to all GPs in [PCT1] last year. As part of the same project we would now like to invite you for an interview to evaluate various strategies of dissemination and implementation of prescribing activities in the Trust as well as issues concerning the local formulary.

The interview will take about 30 minutes. If you would like to participate, please send your name and contact telephone number to us on the response slip attached and I will contact you for a convenient time to meet.

The project has Ethic Committee Approval (Approval No N/02/024). Your personal details will be coded and anonymised for the analysis. If you have any queries or would like more information about the project or the interview, please do not hesitate to contact me on 020 7753 5847 or astrom@ulsop.ac.uk.

Yours sincerely,

Kristina Astrom
Research Pharmacist
Appendix V: Invitation to interview (chapter 6)

Please, tick and return to us via post, fax or email.

☐ Yes, I would like to participate in an interview regarding “what influences prescribing”

Your name: ...........................................................................................................

Practice: ................................................................................................................

Telephone No: .....................................................................................................

☐ No, I do not want to participate because ................................................................

............................................................................................................................

Please return to: (post, fax or email your details)

Kristina Astrom
Research Pharmacist
Centre for Practice and Policy
The School of Pharmacy
University of London
29 - 39 Brunswick Square
London WC1N 1AX

Fax: 020 XXXX XXXX (Attention [PA in PCT1])
Email: astrom@ulsop.ac.uk
Appendix VI: Interview schedule (chapter 6)

Interview schedule

Demographic details

<table>
<thead>
<tr>
<th>Name</th>
<th>Job title</th>
<th>Length of time in position</th>
<th>Former job title</th>
<th>PCT/GP/HA</th>
</tr>
</thead>
</table>

National initiatives

1. What are the influences of the government on GP prescribing?
   - With what policies
   - National documents/White papers
   - By clinical governance
   - By introducing prescribing guidelines
   - Other influences; organisational factors and feedback
     - How can these policies act as facilitators or barriers in influencing GP prescribing
     - Incentives for HA/PCT to undertake these
     - How are these policies being implemented
     - What do you think are the success or barrier issues to the implementation

Local initiatives

2. What initiatives have been used in the PCT to influence prescribing?
   - Local formulary/guideline
   - Organisational factors and GP feedback
   - Incentives for the GPs
   - Whose initiative is this done
   - Barriers to &/or progress of these initiatives

3. On who's initiative is this happening?

Implementation issues

4. Are there any strategies for implementing prescribing initiatives?
   - If so, please describe
     - What are GPs' responses to these strategies
     - How is each intervention taken up by the GPs
     - Why do think this is so
   - How are the various interventions advertised
     - What are the barrier and success issues to these initiatives

5. What, in your opinion, would a successful prescribing intervention look like?
   - Who should design it
   - How should it be implemented
   - Would there be any incentives. Please expand
   - What would your role be in this
   - In the future, do you think the influences on prescribing (activities) will be the same or different. Please expand

6. What do you see is the role of your PCT in influencing prescribing?
   - Please expand
   - Would you like to have more influence on prescribing
Appendix VI: Interview schedule (chapter 6)

7 Please, mention the top 5 influences on GP prescribing?
   • What makes a GP prescribe in a certain way
   • Why

8 What is the main role of clinical guidelines?

9 What is the main role of formularies?

(Not HA)
10 How useful is a local formulary/clinical guideline? Is it important to have one? Please expand.

(GPs only)
11 Do you need additional knowledge to use the formulary/guideline?

12 Has the publication of the local formulary had any influence on your prescribing?

13 Do you adhere to the local formulary?

14 Did you have any influence in developing the formulary?

15 Would you like to have more influence on shaping the formulary?

16 Do you participate in PCT initiatives?
   Incentive schemes
   Prescribing boards
   Educational sessions

17 Do you read the local prescribing newsletter sent out by the PCT?
   • TH only: Do you read it on-line or from a hard copy?

18 Do you read about prescribing issues in journals?
   • Which journals?
   • Do you rate evidence in different journals differently?
   • How do you compare evidence for prescribing in the newsletter with that published in journals?

19 What level of contact do you have with the advisors in the PCT?

20 How much influence do you as a GP have in influencing policy?

21 Do you feel that your prescribing is being controlled or restricted in any way?

(Strategic HA personnel only)
10 What initiatives are undertaken or promoted by the strategic HA to influence GP prescribing?
   • Organisational factors and feedback
   • Incentives for HA/PCT to undertake these?

11 How does/did the HA disseminate and implement the interventions at PCT level?

12 Is the role of your HA one of policy or practice when it comes to influencing prescribing?