Factors affecting Diabetes Care Delivery

In Primary Care

In Salford

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MSc in Health Informatics
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Dissertation
August 2004
Abstract

Background and Context, Rationale for study: The dissertation subject and title was chosen because of the importance of diabetes as a chronic disease which had health and cost implications for the nation. This is reflected in the Diabetes NSF. There are also NHS modernisation plans to achieve improvements in healthcare delivery through information management and technology, and this is relevant to diabetes services in primary care in Salford.

Literature Search and Review: Using methods and skills learnt from a previous module (HAR6002), 21 studies were reviewed for critical appraisal. These studies found that structures and programmes of care can improve care processes and patient outcomes, in diabetes. However, there seems to be a ‘missing link’ between improvements in care processes and patient outcomes. This provided a subject for research. Apart from helping to develop a focus for the research title, the studies also provided insight into approach and methodology, methods and measures.

Methodology: A mixed methodology of triangulation was used. A questionnaire was developed, piloted and sent to all GP practices in Salford. Quantitative data was statistically analysed. An interview schedule was developed to interview healthcare staff. Sampling for the interviews was purposeful, from GP practices with the best and worst patient outcomes. Qualitative data was subjected to thematic analysis. An audit of the Diabetes Information System with its database of patient outcomes was essential to provide information for sampling and statistical analysis.

Quantitative analysis and results: data for statistical analysis was available from 44 out of the 61 GP practices in Salford (72%). There were 4607 patients with diabetes, out of 164552 patients (2.8% prevalence). 65% (n=2992) of diabetics had an annual review, and out of these 77.8% (n=2327) had HbA1c measurements. Diabetics who had HbA1c measurements had better outcomes.
Factors affecting Diabetes Care Delivery in Primary Care in Salford

Out of the various factors of care studied, having a GP interested in diabetes was the only factor associated with improved care outcomes.

*Qualitative analysis and results:* There were 5 themes identified and explored;
1. healthcare professional interest, motivation, attitude, education, knowledge, confidence and specialisation
2. patient information, education, responsibility, compliance, interest, empowerment and self-management
3. structures and infrastructures e.g. premises, computerisation and diabetes mini-clinics
4. systems and processes, access to specialist care, communication, relationships and teamworking
5. barriers to ideal diabetes care delivery

*Discussion and reflections:* The quantitative study had failed to show any association between the various features of structured diabetes care and patient outcomes, apart from GP interest in diabetes. This is not in keeping with previous research, and may be due to various confounding factors. It may also be due to developments which have taken place over the past decade, as a result of previous research, so that other issues in diabetes care now come into the forefront as factors affecting diabetes care delivery. These issues are social issues and might be the ‘missing link(s)’ between care processes and care outcomes.

*Recommendations:* Recommendations are made for developing “standardised” interventions. These can be evaluated in future research using the action research cycle. The role of IT, and development of interactive IT systems to support healthcare delivery, is important for quality improvements in healthcare.

*Conclusions:* This study has provided information about current practices in diabetes care delivery in primary care in Salford. It has also highlighted the social issues which may influence care outcomes, and put forward the proposal of using an interactive clinical decision support IT system to improve healthcare delivery and outcomes, in diabetes care in primary care in Salford.
Table of contents

Title page 1

Abstract 2

Table of contents 4

Chapter One

Introduction 7
Background & context 7
A national priority 9
A clinical priority in Salford PCT 9
Own work and interest 11

Chapter Two

Literature Search and Review 13
The review topic and objectives 13
Review methods: 14
Criteria for considering studies to be included 14
Search method 15
Study selection 16
Critical appraisal of the selected articles 18
Tables of included studies 19
Results of the review 22
Discussion 27
Conclusions 29
Limitations 31
Development of research question(s) 31

Chapter Three

Methodology 33
Aim and objectives 33
Method 34
Ethical issues 36
Planned data analysis 37
<table>
<thead>
<tr>
<th>Appendix 1</th>
<th>Abbreviations</th>
<th>101</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix 2</td>
<td>Data extraction form</td>
<td>102</td>
</tr>
<tr>
<td>Appendix 3</td>
<td>Diabetes Care Survey Questionnaire</td>
<td>103</td>
</tr>
<tr>
<td>Appendix 4</td>
<td>Diabetes Care Interview Schedule</td>
<td>104</td>
</tr>
<tr>
<td>Appendix 5</td>
<td>Information sheet</td>
<td>106</td>
</tr>
</tbody>
</table>
Chapter One
Introduction, Background and Context, Rationale for study

Introduction

Reasons for choice of dissertation title/project:

- Relevance to population health – importance of diabetes e.g. St Vincent Declaration (1989)
  - a clinical priority in Salford PCT
  - personal special interest: GP with a Special Interest (GPSI)

- Relevance to work and workplace – organisation related, as Salford PCT is
  - an example of PCTs & their functions – e.g. delivery of healthcare services
  - current work & workplace – a living example
  - supporting my attaining of a MSc in HI – financially and other resources

- Relevance to MSc in Health Informatics – use of information to promote quality healthcare
  - use of Diabetes Information System (DIS) computerised database to capture and store health outcome measures
  - gathering of information to gain understanding of current issues
  - processing information to support PCT in developing healthcare services, e.g. use in recommending, planning, implementing and evaluating changes

Background & context

Diabetes is a serious chronic disease that affects 3% (1.5 million) of the UK population and accounts for 9% of total NHS hospital costs (Audit Commission
Factors affecting Diabetes Care Delivery in Primary Care in Salford

2000). The prevalence of coronary artery disease is twofold higher in men with diabetes and fourfold higher in women with diabetes compared to non-diabetics (Wingard & Barrett-Connor 1995). Strokes are two to three times more common in patients with diabetes (Kuller 1995). Diabetic retinopathy is the main cause of blindness in adults between 20 and 74 years of age (Klein & Klein 1995) and diabetic nephropathy is the main cause of patients undergoing dialysis for end-stage renal failure (Nelson et al 1995).

The St Vincent Declaration (1989) stated the goals for detection and control of diabetes and its complications, and the needs for education, research and centres of excellence for diabetes care. The 1990s saw the development of hospital diabetes centres that enabled patients to receive care from a team of specialists including endocrinologists or diabetologists, diabetes specialist nurses (DSNs), podiatrists, dieticians, ophthalmologists, renal physicians and vascular surgeons. At the same time, the role of primary care expanded, so that care given to patients with diabetes type 2 was shared between clinicians in primary care and secondary care (Greenhalgh 1994, Goyder 1998). Increasingly, more patients with diabetes type 2 are receiving all their care in the community.

Also, around this time, results of research evidence emphasize and demonstrate the need for good management of diabetes and its complications. The Diabetes Control and Complications Trial (DCCT 1993) showed that tight glycaemic control reduced the incidence of complications in patients with diabetes type 1. This was followed by publication of the UK Prospective Diabetes Study (UKPDS 1998) showing benefits of early diagnosis and tight glycaemic and blood pressure control to reduce complications in patients with diabetes type 2. These landmark studies highlighted new healthcare needs, resulting in rising demands for services for patients with diabetes. Local Diabetes Services Advisory Groups (LDSAGs) were established in some districts bringing together healthcare professionals from primary and secondary care, as well as diabetic patients. These groups report to and inform health authorities of services for diabetes which should be developed and monitored.
A national priority

As part of the NHS plan, the National Service Framework (NSF) standards for diabetes were released in Dec 2001, and the delivery strategy was released in November 2002 for implementation from 2003. The Diabetes NSF sets 12 standards or mission statements for prevention and management of diabetes, and the delivery strategy sets out national objectives for implementation, against which performance can be monitored and measured.

The number of people affected with diabetes is predicted to rise dramatically, doubling to 3 million by 2010 (Amos 1997). This represents increased morbidity and mortality to the population of people suffering from diabetes and increased workload in providing a range of comprehensive services and therapy for this population, hence increased cost healthcare costs.

As healthcare costs are escalating, and provision of services are often unequal and inequitable, the need for efficient use of resources drives identification and provision of best clinical practice, which comes from clinical research and service restructuring. There is also urgent need for strategic planning, delivery and monitoring of diabetes services to cope with current and future demands, which requires information from good quality national and local population data.

A clinical priority in Salford PCT

In 2000, the Audit Commission carried out a study of diabetes services in England and Wales, which included hospitals, general practices, health authorities and patients. The results show many services struggling to cope with current levels of demand, and considerable variation in the levels of care provided. The recommendation was for resources to be directed at community and primary care level, enabling good quality and managed routine care to be provided outside of hospital.
The recent establishing and development of Primary Care Trusts (PCTs) with commissioning powers makes it an appropriate time to review, plan and organise diabetes services in new and exciting ways to deliver equitable and quality care to diabetic patients. Salford PCT represents a PCT keen to prioritise diabetes care because of previous work already done in this area.

Already developed in the district of Salford in past 10-12 years, are:

- guidelines for preventative care of patients with diabetes in Primary Care
- a central Diabetes register held within Secondary Care
- a Diabetes Information System (DIS) developed in Secondary care with patient information input from Primary Care (in the form of a minimum clinical data set) which allows regular district wide clinical audits of diabetes
- accredited training for practice nurses who provide care for patients with diabetes
- continuing education in Diabetes and CHD for GPs, in quarterly evening meetings with a 2 year rolling programme
- a Local Diabetes Services Advisory Group (LDSAG) to identify areas for improvement and promote integration of services from a patient perspective

The Modernisation Directorate of the Salford PCT plans strategies to develop services to meet the standards of the NSF for diabetes, as well as to improve clinical outcomes of care for patients with diabetes. Part of these strategies include:

- supporting self management in people with diabetes, i.e. patient empowerment
- ensuring that there are Diabetes registers in all Primary Care practices
- developing systems of call-recall in Primary Care to provide structured review, in accordance with district guidelines
- promoting use of IT in Primary Care to facilitate accurate recording of information and enable ease of information extraction for clinical audit
Facors affecting Diabetes Care Delivery in Primary Care in Salford

- improving access to diabetes care by developing integrated care pathways and shifting the majority of care from the acute to the community sector, and providing the resources to enable this

**Own work and interest**

As a GP, my personal area of clinical interest is diabetes. Because of this, I was employed (as a GP with Special Interest) by Salford PCT to facilitate development of diabetes services within Primary Care, to improve healthcare outcomes of patients with diabetes in Salford, to standards of care as defined by the NSF for diabetes. In order to achieve such a mandate, information needs to be gathered about current and ‘ideal’ care practices and outcomes. I need to know what constitutes good quality care i.e. care that improves health outcomes, and which factors affect the delivery of quality care.

The answers that inform these questions can be translated into changes or new models of service delivery which, when implemented, should result in improved health outcomes. Information gathered can be used to identify areas of poor performance or good practice (Vallence-Owen & Cubbin 2002) and to plan strategy for delivering quality and equality in care. Information gathered needs to be of good quality so that strategy can be appropriately planned and resourced. Good quality information is necessary, and requires collection and analysis of appropriate and good quality data. Hence there is a need for good quality data collection.

Another of my interest is the important role that health informatics play in the development and delivery of good quality healthcare. Health informatics provides the infrastructures to capture, store, manage and produce relevant, timely and accurate information. These infrastructures includes relevant information technologies, information systems, and information management, all working together to support the healthcare organisation, i.e. healthcare professional, patients, the public, and managers and planners. Such a role is obviously viewed
significantly, as investment in ICT is plays a major part in the NHS modernisation plan (NHS Exec 1998).

Combining my interests in health informatics and diabetes, as well as my role in Salford PCT in healthcare service development and improvement, the specific question I am asking for this research project is “what factors affect the provision and quality of care to diabetes patients in primary care, in Salford?” This research question will focus on the social science rather than the clinical science of the subject of diabetes care. There has already been much research studying the infrastructure or process in primary care that influence clinical outcomes of diabetic patients. These processes or systems of diabetes care provision constitute ‘structured diabetes care’. Relevant literature review will help to further focus the research question(s).
Chapter Two

Literature Search and Review

In the course of my work and reading, I had gained an impression of the desired quality outcomes, the work done in developing care models for the delivery of diabetes services and the increasing role of health informatics, to achieve these quality outcomes. There are questions, which inevitably result as a by-product of reading. However, I had not systematically searched for answers to these questions. Forming a research question would require extensive reading. Hence, there is a need for reviewing the literature.

Relevant literature review would help me to develop and focus the questions for my own research project while critical appraisal of relevant studies would help me to gain insights (e.g. into previous approaches, methods and measures). As mentioned earlier, ‘structured diabetes care’ has been shown to improve process and patient outcomes. However, the definition of structures and outcomes of care vary between studies.

Using the skills I have gained from a previous module of this Health Informatics course (HAR6002), I should be able to conduct a good quality literature search and review. The aim of this literature review is to identify good quality research, to appraise best available evidence, to determine which factors affect care provision and outcomes. As a result, I should then be able to identify the gaps or questions in research, from which my research question can be developed.

The review topic

The question to be addressed by the literature review is “what factors affect the provision and quality of care to diabetes patients in primary care?”
Objectives

1. Identify good quality research that answers the above question
2. Appraise the best available evidence currently in practice
3. Define the factors which answers the question
4. Determine the effects of the various factors on care provision and outcomes
5. Examine relevance of previous research to current situation in Salford
6. Develop questions for my research project

Review methods

1. Set criteria for considering studies
2. Search method
3. Study selection
4. Critical appraisal or evaluation of selected articles
5. Data extraction and organisation
6. Summary/overview/results of the literature review
7. Discussion of the results
8. Conclusions of findings and implications of issues which may inform future research

Criteria for considering studies to be included

Types of studies – based on hierarchy of evidence, systematic reviews of good quality research, then randomised control trials (RCTs), controlled clinical trials (CCTs), controlled before-after studies (CBAS), interrupted time series studies (ITS) and qualitative or descriptive studies.

Types of participants – health care professionals looking after patients with diabetes, in primary care. This includes doctors and nurses, as well as allied health professionals (e.g. dieticians, podiatrists, optometrists). However, the
studies of professionals in only hospital settings are excluded, unless they worked across primary care and hospital settings.

**Types of interventions** – any professional or organisational interventions affecting the quality of diabetes care provision or outcome. However, studies of only patient orientated interventions are excluded, unless they are included within multifaceted interventions.

**Types of outcome measures** – improvement in diabetes care provision or patient outcomes using reliable, predetermined and objective measures, preferably with meaningful statistical analyses.

**Search method**

**Data sources**


2. Citations in relevant and related articles
Factors affecting Diabetes Care Delivery in Primary Care in Salford

Search strategy

Using free text and exploded MeSH subheadings, keywords:

- “diabet$”
- “primary care”, “primary healthcare”, “general practice” and “family practice” were combined using the Boolean operator OR
- “care”, “quality” and “improvement” were combined using the Boolean operator AND
- then the three sets of results combined using the Boolean operator AND
- then the results were limited to “reviews”
- these search results then went through several stages before final selection of studies for appraisal

An initial search was done in April 2003, which provided the initial information for defining and developing my own research question. Then another search was repeated in September 2003, to identify new articles, studies or reviews. The second search did result in retrieval of more articles to appraise. This was due to a few new articles, as well as changes in my thought processes and developing of new questions (e.g. in methodology and outcome measures) as a result of the initial reading and the retrieval of data from my own research.

Study selection

Identification of selected studies involved several stages, with inclusion and exclusion criteria applied at each stage:

1. The search results from electronic databases were summarily inspected. There were a total of two hundred articles from MEDLINE and CINAHL, and thirteen complete reviews from the Cochrane Library, which were potentially relevant, and were selected for further examination.
2. Abstracts and bibliographies of the selected articles were printed and further inspected for inclusion in the report. This resulted in fifty-one articles to be considered.

3. Full text copies of these articles and reviews were searched for, to be printed and assessed. Fifteen potentially relevant citations, from these articles and reviews, were also searched for to be printed and assessed. Finally, seventeen studies, three systematic reviews and one meta-analysis met the above mentioned inclusion criteria for appraisal. Also included from citations were five reviews and one meta-analysis on computerised information systems, and one systematic review on audit and feedback.

**Flow diagram of study selection process**
(adapted from CRD report 4 stage II phase 4)
Critical appraisal of the selected articles

Study quality assessment

Quality assessment of these studies was performed using the critical appraisal tool from CASP 2002.

Methodological quality

Systematic reviews and those which promised rigorous evaluation of evidence were included. The mention of study selection, methodological quality, including quality criteria met, randomised assignment, method of randomisation, blindly assessed outcomes, participant follow-up, reliable measurements of relevant outcomes, protection against contamination, statistical analyses, would add weight to the quality and strength of evidence. Qualitative studies, which appropriately expanded the thinking to provide answers for the review topic, with clear description of methods of sampling, data collection and analysis, were also included.
### Tables of included studies

<table>
<thead>
<tr>
<th>Studies</th>
<th>Methods</th>
<th>Participants</th>
<th>Interventions</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenhalgh 1994</td>
<td>Systematic review –</td>
<td>Healthcare professionals</td>
<td>Professional education, specific protected time, structured check list, standard management protocol, liaison team, arrangements in follow-up (prompts)</td>
<td>Care processes and patient outcomes</td>
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<tr>
<td></td>
<td>good quality</td>
<td></td>
<td></td>
<td>1-2y follow-up</td>
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<tr>
<td>Griffin 1998</td>
<td>Meta-analysis –</td>
<td>General Practitioners</td>
<td>Professional education, management protocols or guidelines, structured review forms, Computerised prompts (GP &amp; patient) for follow-up,</td>
<td>Patient outcomes</td>
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<tr>
<td></td>
<td>good quality</td>
<td></td>
<td></td>
<td>1-5y follow-up</td>
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<td>Griffin 2003</td>
<td>Systematic review –</td>
<td>General Practitioners</td>
<td>Professional education, management protocols, personal review form/plan</td>
<td>Follow-up, costs and patient outcomes</td>
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<td></td>
<td>good quality</td>
<td></td>
<td>Computerised records &amp; follow-up arrangements</td>
<td></td>
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<tr>
<td>Renders 2001a</td>
<td>Systematic review –</td>
<td>Healthcare professionals</td>
<td>Professional education, audit &amp; feedback</td>
<td>Care processes and patient outcomes</td>
</tr>
<tr>
<td></td>
<td>good quality</td>
<td></td>
<td>Changes in professional roles, medical record system, arrangements in follow-up.</td>
<td>6-36m follow-up</td>
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<td></td>
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<td>Financial incentives. Patient education</td>
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<tr>
<td>Renders 2001b</td>
<td>Non-randomised</td>
<td>General Practitioners</td>
<td>Professional education, peer groups, expert opinions, diabetes guidelines, structured diabetes templates, audit &amp; feedback, follow-up/recall system</td>
<td>Care processes and patient outcomes</td>
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<td>controlled trial –</td>
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<td>42m follow-up</td>
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<td>good quality</td>
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<tr>
<td>Montori 2002</td>
<td>Non-randomised</td>
<td>Healthcare professionals</td>
<td>Planned care program as placebo v computerised DSS</td>
<td>Clinical processes and metabolic outcomes</td>
</tr>
<tr>
<td></td>
<td>controlled trial –</td>
<td></td>
<td>Planned care program included practice guidelines, guideline implementation team, clinical information systems e.g. patient register, management flow sheet, standard referral forms, audit &amp; feedback</td>
<td>24m follow-up</td>
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<td></td>
<td>good quality</td>
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<tr>
<td>Davidson 2003</td>
<td>Non-randomised</td>
<td>Healthcare professionals</td>
<td>Specially trained nurses and pharmacists, under supervision of diabetologist, following protocols &amp; algorithms</td>
<td>Process and outcome measures</td>
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<td></td>
<td>controlled trial –</td>
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<td>3-12m follow-up</td>
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<td></td>
<td>moderate quality</td>
<td></td>
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</tr>
<tr>
<td>Denver 2003</td>
<td>RCT – good quality</td>
<td>Healthcare professionals</td>
<td>Specialist nurse following recommended hypertension guidelines, for follow-up, review and treatment</td>
<td>SBP &amp; DBP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6m follow-up</td>
</tr>
<tr>
<td>Study</td>
<td>Methods</td>
<td>Participants</td>
<td>Interventions</td>
<td>Outcomes</td>
</tr>
<tr>
<td>------------------</td>
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<tr>
<td>Clark 2001</td>
<td>RCT – good quality</td>
<td>Healthcare professionals</td>
<td>Software generated patient risk profiling and clinical intervention (using guidelines and algorithms), specialised and skilled practice team using action plans for follow-up reviews and medical intervention Patient education</td>
<td>Care processes, patient outcomes, patient and provider satisfaction 12m follow-up</td>
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<tr>
<td>Grant 2003</td>
<td>Non-randomised controlled trial – moderate quality</td>
<td>Primary care physicians (PCP)</td>
<td>Clinical software patient ranking, prompt to PCP with patient report and management recommendations (from evidence based guidelines)</td>
<td>Adherence to recommendations 3m follow-up</td>
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<tr>
<td>Meigs 2003</td>
<td>RCT – moderate quality</td>
<td>Healthcare professionals</td>
<td>Optional web-based clinical DSS with patient specific recommendations from evidence based guidelines</td>
<td>Care processes and patient outcomes 1y follow-up</td>
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<tr>
<td>Baker 2001</td>
<td>Cohort study – moderate quality</td>
<td>Primary care providers</td>
<td>Optional web-based clinical MSS with evidence based guidelines and performance feedback</td>
<td>Specific care processes 22m follow-up</td>
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<tr>
<td>Pringle 1993</td>
<td>Cross sectional study – good quality</td>
<td>General practice</td>
<td>Patient, doctor, practice, care process features</td>
<td>Glycaemic control (HbA1c)</td>
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<tr>
<td>Khunti 2001</td>
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<td>General practice</td>
<td>Practice, patient or organisational features</td>
<td>Care processes and patient outcomes</td>
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<td>Bower 2003</td>
<td>Cross sectional study – moderate quality</td>
<td>General practice</td>
<td>Practice structure and team process</td>
<td>Care processes</td>
</tr>
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<td>Khunti 1999</td>
<td>Qualitative – moderate quality</td>
<td>Healthcare professionals</td>
<td>Factors potentially affecting quality of care of patients with diabetes</td>
<td>54 potential factors: patient, practice and organisational factors</td>
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<td>Brown 2003</td>
<td>Qualitative – moderate quality</td>
<td>Family practice</td>
<td>Factors potentially affecting care provision for patients with diabetes</td>
<td>Practice, physician and organisational factors</td>
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<td>Van den Arend 2001</td>
<td>Qualitative – moderate quality</td>
<td>Professionals of diabetes care</td>
<td>Elements for high quality care of patients with DM2</td>
<td>Organisational and patient factors</td>
</tr>
</tbody>
</table>
## Factors affecting Diabetes Care Delivery in Primary Care in Salford

<table>
<thead>
<tr>
<th>Study</th>
<th>Methods</th>
<th>Participants</th>
<th>Interventions</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helseth 1999</td>
<td>Qualitative</td>
<td>Primary care physicians</td>
<td>Primary care physicians’ view of diabetes care</td>
<td>Struggle between ideal care &amp; patient compliance</td>
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<td></td>
<td>– good quality</td>
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<td>Agarwal 2002</td>
<td>Qualitative</td>
<td>General practice</td>
<td>GP perception of barriers in provision of diabetes care</td>
<td>Patient, organisational, educational issues</td>
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<td>– moderate quality</td>
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<td>Stevenson 2001</td>
<td>Qualitative</td>
<td>Primary healthcare teams</td>
<td>GPs and PNs perception of features of quality improvement in diabetes care</td>
<td>Team work, systems, positive attitude to quality improvement</td>
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<td>Jamtvedt 2003</td>
<td>Systematic review</td>
<td>Healthcare professionals</td>
<td>Audit &amp; feedback</td>
<td>Professional practice</td>
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<td>– good quality</td>
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<td>Shea 1996</td>
<td>Meta-analysis</td>
<td>Physicians and patients</td>
<td>Computerised clinical reminder systems</td>
<td>Preventive services</td>
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<td>– good quality</td>
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<td>Hunt 1998</td>
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<td>Computer-based clinical DSS</td>
<td>Preventive care, drug dosing, diagnostic aids, patient outcomes</td>
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<td>– good quality</td>
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<td>Healthcare professionals</td>
<td>Programs of care to improve practice performance</td>
<td>Performance and patient outcomes</td>
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<td>– good quality</td>
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<td>Doctors</td>
<td>Feedback and reminders</td>
<td>Diagnostic and preventive performance</td>
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<tr>
<td></td>
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</tbody>
</table>

NB the last 6 studies were not specifically looking at interventions for diabetes, but general healthcare.
Data extraction

This was done using a proforma (see appendix 2). From each study, specific data on interventions or programs of care, and outcome measures of care processes and patient health were extracted to identify potential factors and their effect on diabetes care delivery.

Results of the review

21 studies met the inclusion criteria, and also included from citations were 6 studies on computerised information systems and audit & feedback. Of the 21 studies which were included, 3 are systematic reviews of good quality and 1 a good quality meta-analysis. There are 3 RCTs, 4 CCTs, 1 cohort study, 3 cross sectional studies and 6 qualitative studies, of good and moderate quality. Because of the heterogeneity of the studies, settings, interventions, professional and patient populations and outcome measures, I have presented the results in a tabular form (see above Table of included studies) and a descriptive narrative (below). 6 other studies (1 meta-analysis and 5 systematic reviews) were included from citations, because they provided the some of the evidence for the interventions which were examined in the included studies, and because of the current interest in the role of computerised information systems in the development and delivery of good quality healthcare.

The Greenhalgh (1994) systematic review looked at shared care for patients with diabetes. Shared care involved the expansion of the role of primary so that GPs would assume responsibility for the routine review of their patients with diabetes. Prior to this, diabetes care was considered a specialist skill. Greenhalgh made an extension search through published and unpublished studies of various types of methodologies and shared care schemes. She concluded that structured care by GPs with an interest with diabetes, supported by specialist liaison teams produced comparable and occasionally superior care to that provided by hospital specialists. However, unstructured care by disinterested and unsupported GPs was ineffective and wasteful of resources.
Griffin (1998) in a meta-analysis of 5 RCTs, and Griffin & Kinmouth (2003) in a systematic review, compared diabetes care by GPs, either alone or as part of a shared care scheme, to hospital outpatient care. The conclusions were similar to Greenhalgh’s. Unstructured GP care was associated with poorer follow-up, worse glycaemic control and higher mortality than hospital care. However, structured GP care achieved standards of care comparable to hospital outpatient care. In the primary studies, all GPs were provided with educational sessions and/or management protocols.

Renders et al (2001a) published a systematic review in *Diabetes Care* in 2001, and this was subsequently amended and included in the *Cochrane Library* in 2003. This review looked at 41 heterogeneous studies with multi-faceted interventions targeted at healthcare professionals, organisation of care, or both. Professional interventions included educational materials, educational meetings, local consensus processes, educational outreach and audit & feedback. Organisational interventions included patient education, follow-up arrangements, changes in medical record system, revision of professional roles, multidisciplinary team, case management, changes to setting of service delivery, integration of services and communications between healthcare professionals. Outcomes of care processes were objectively measured health professional performance i.e. measuring of weight and BP, testing of blood glucose, HbA1c, cholesterol, creatinine and urine, examination of feet and eyes, making follow-up or referral arrangements. Patient outcome measures were hospital admissions, retinopathy, neuropathy, nephropathy, cardiovascular diseases, amputations and mortality. Surrogate measures of weight and BP, glycaemic control (HbA1c), levels of cholesterol and creatinine were also used to assess patient outcomes.

Renders et al (2001a) concluded that it was difficult to know if post-graduate education contributed to improvements, but if used in combination with other professional interventions, care processes were improved. However, the improvements were found in only studies which had low standards of care at baseline, whilst those with good baseline care did not demonstrate any effect.

Changes in medical record systems e.g. computerised reminders/prompts and
audit & feedback, improved process outcomes. Combination of various organisational interventions with patient education improved process and patient outcomes. Nurse involvement in care delivery, through patient education and compliance, improved patient outcomes.

In 8 studies (3 RCTs, 4 CCTs, 1 cohort study) of good and moderate quality, the setting was in community care except for 1 study which was in a hospital outpatient clinic (Meigs 2003). Renders et al (2001b) in a non-randomised trial used an intervention programme consisting of professional education, consultation of experts, guidelines for diabetes care and education on implementation of the guidelines, diabetes care templates, audit & feedback and a recall system. After 42 months of follow-up, care outcomes i.e. annual patient visits, measuring of BP, testing for HbA1c and lipid levels, had improved. However, patient outcomes using surrogate measures i.e. BP, HbA1c and lipid levels, were the same in the intervention and control groups.

Montori et al (2002) compared a planned care programme with the addition of a diabetes electronic management system (DEMS) in a non-randomised controlled trial. The planned care programme improved clinical process measures as well as patient outcomes (HbA1c). Although addition of DEMS improved process measures more than planned care programme had, patient outcome measures remained the same.

Davidson (2003) and Denver et al (2003) found that specialist trained nurses, under the supervision of a specialist, following recommended guidelines, protocols or algorithms for follow-up, review and treatment carried out almost all process measures significantly more frequently than primary care physicians. Surrogate measures for patient outcomes also improved i.e. HbA1c and BP. Better adherence to guidelines and protocols, with greater frequency of changes in treatment accompanying frequent monitoring, was associated with the observed improvements. Possible explanations for this included nurses having more time to spend on patient education as well as ensuring patient compliance with medication.
Clark et al (2001), Grant et al (2003), Meigs et al (2003) and Baker et al (2001) used intervention programmes which involved the use of software systems. These systems profiled patient risks and generated management recommendations from evidence-based guidelines. In Clark’s study, a healthcare team met to approve and implement action plans. 12 months follow-up assessment demonstrated increased provider adherence to care guidelines, and improvements in HbA1c and BP. Patient and provider satisfaction was also improved. After 3 months, Grant’s study found that PCPs followed testing recommendations significantly more, but not the therapeutic change recommendations. Meigs and Baker used web-based diabetes management support systems, which were optional. Meigs found that use of the system significantly increased process measures, and also improved HbA1c and LDL cholesterol levels, although not significantly. Baker found that use of the system was more likely to result in increased routine testing in patients with diabetes i.e. process measures.

Pringle et al (1993), Khunti et al (2001) and Bower et al (2003) carried out cross-sectional studies looking at features in primary care i.e. doctor, patient, practice and organisational factors which may affect quality of diabetes care. The studies used audit data from GP records, standard questionnaires and statistical analysis, to find associations between factors in primary care and HbA1c and/or care processes. Pringle found that doctor interest in diabetes (but not knowledge of diabetes, style nor personality), bigger practices with diabetes mini-clinics, access to dietician, practice nurses skilled in diabetes care, male patients and patients with <7 years duration of diabetes (but not age, social status, lifestyle, attitudes, knowledge of diabetes or satisfaction with care), GP care alone rather than shared care with hospital, were associated with significant improvement in HbA1c. Khunti found that practices which were smaller, fundholding or had a recall system had significantly better process measures, while those with more socioeconomically deprived patients had lower process outcomes, and those with more patients in shared care had worse process and HBA1c outcomes. Having GPs or nurses’ interest in diabetes, a diabetes mini-clinic, more nurses or personal care were not associated with improved process or patient outcomes. Bower
Factors affecting Diabetes Care Delivery in Primary Care in Salford

found that longer appointments and better healthcare team climate were associated with improved care processes.

Finally, 6 qualitative studies were reviewed to further explore more features in primary care which might affect diabetes care provision and outcome. Unfortunately, most of these studies were not of particularly good quality, and information gained was of limited value. Khunti (1999) identified a possible 54 factors; 20 practice, 14 patient and 20 organisational, but doesn’t detail the possible effect of these factors. Brown et al (2003) also identified patient, physician and system factors, as perceived by family physicians. van den Arend et al (2001) invited 56 experts on diabetes care (specialists and GPs and others not defined) to rank 18 elements on organisation and 9 on patient education. Structured or protocol care, active patient participation and patient education were perceived as the most important prerequisites for high quality diabetes care. Helseth et al (1999) presented an excellent paper on Primary Care Physicians’ perception of diabetes management, and found that PCPs struggle to impose the goals of good diabetes care on patients because of problems with adherence. This is in turn due to patient expectations and circumstances. Agarwal et al (2002) also presented the GP perspective and identified patient factors e.g. getting patients to change lifestyle practices, patients failure to attend or adhere to medication, and organisational factors e.g. lack or space, time, funding, poor communication and access to secondary care, keeping up with educational updates in diabetes. Stevenson et al (2001) interviewing GPs and practice nurses found that good team work, recognising the need for systematic plans to overcome barriers and a positive attitude to quality improvement, but not necessarily an interest in the disease, are associated with improvement in care.

Also included in this review are 6 papers which did not necessarily meet the inclusion criteria but provided evidence for some of the interventions used in the above studies. Jamtvedt et al (2003) assessed the effect of audit & feedback on professional practice and healthcare outcomes, and found that it is effective but mainly where baseline adherence to recommended practice is low, and mainly in performance rather than health outcomes. 1 meta-analysis and 3 systematic
reviews on computerised clinical reminder system and 1 systematic review on non-computerised reminder systems found that reminder systems, whether computerised or otherwise, can improve performance measures but does not demonstrate convincing improvements in health outcomes.

Discussion

Since the 1990s, care of the patient with diabetes type 2 has been shifting from secondary to primary care (Greenhalgh 1994, Goyder 1998). Naturally health care professionals in primary care would need to have the same or similar resources as their colleagues in secondary care, in order to maintain quality of care for these patients. As a result, professional educational programmes and guidelines or protocols for chronic disease management were developed. However, Greenhalgh (1994) and Griffin (1998) have shown that GPs are still not able to provide the desired quality of diabetes care despite professional education and management protocols. They suggest that ‘structured care’ is the missing link.

However, while Griffin is satisfied to define that as computerised recall, prompting GPs and patients to attend for regular diabetes review, Greenhalgh defines it as systematic recall (not necessarily computerised), allocation of protected time and adherence to standard management protocols. She also suggests other success factors e.g. extensive planning, clear objectives, GPs with diabetes interest supported by well-developed liaison teams, locally developed written guidelines for diabetes management guidelines, and regular audit & feedback to maintain standards. This resembles the strategy of business management and planning. Unfortunately, despite the lack of planning and infrastructure as suggested by Greenhalgh, the shift of care of diabetes type 2 patients to the community has continued.

Naturally, diabetes care in the community has been unequal and inadequate (Beckles 1998). However, much research has followed to identify interventions
which would improve diabetes care in the community (Renders 2001a). Most of
the studies have been short (3-42 months with the majority <2 years) and the
outcome measures have been of limited use. Measures of care processes were
often what were easiest to measure e.g. measuring of weight and BP, testing of
blood glucose, HbA1c, cholesterol, creatinine and urine, examination of feet and
eyes, making follow-up or referral arrangements. These reflect the degree of
monitoring the patient has been subjected to but may not necessarily reflect the
actual medical care given e.g. patient counselling to achieve patient understanding
and commitment, changes in therapy in line with evidence based guidelines to
attain targets and negotiation with patients to achieve compliance. Measures of
patient health outcomes were often surrogate measures e.g. weight and BP,
glycaemic control (HbA1c), levels of cholesterol and creatinine. However, these
surrogate measures are also often used in pharmacological trials and do reflect
dependent outcomes e.g. mortality and complications of diabetes, namely coronary
artery disease, strokes, blindness, lower limb amputations and renal failure.
Unfortunately, most studies tended to assess care processes, but patient outcomes
were rarely assessed.

Interestingly, when Renders et al (2001b) studied the effects of an intervention
programme on care processes and patient outcomes, they felt that there was a
‘missing link’ in transferring the favourable effects on care processes to patient
outcomes. Montori (2002), Davidson (2003) and Denver (2003) seemed to have
found the ‘missing link’ as their interventions produced improved process and
patient outcomes. Montori’s planned care programme involved guideline
implementation teams who determined strategies for improving management of
diabetes, and clinical information systems that provided patient lists, chronic
disease management flow sheets, referral forms for patient support sessions and
audit & feedback. In Davidson’s and Denver’s studies, specialist nurses who
adhered to guidelines, performed not only the frequent monitoring but also the
necessary treatment changes required. It would appear that programmes in
themselves no matter how multifaceted (Grimshaw 2001) couldn’t improve
patient outcomes unless adherence to guidelines is assured.
Comparing the studies which involved the use of software systems: Clark (2001),
Grant (2003), Meigs (2003) and Baker (2001), only Clark’s study demonstrated
an improvement in patient outcomes. This study differed from the others by
having a healthcare team met to approve and implement action plans. Grant’s
study also examined the barriers to therapy change, and found that serious co-
morbidities or non-compliance in patients were the main problems.

The findings so far, would seem to suggest that the ‘missing link’, between care-
programmes and patient outcomes, centred on implementing therapy and changes
in therapy, as well as patient compliance with therapy. Recent developments have
focussed more on patient education and patient empowerment, in the hope that
increased patient knowledge would ensure patient commitment and compliance to
therapy. The 6 qualitative studies included in this review have looked for other
potential factors, and have highlighted barriers as well as opportunities in quality
diabetes care delivery. Cross-sectional studies done by Pringle et al (1993),
Khunti et al (2001) and Bower et al (2003) had conflicting findings and
questioned the association various factors to good patient outcomes, namely
having a GP or practice nurse interest in diabetes, diabetes mini-clinics, more
nurse resource or personal care, adequate knowledge in diabetes, patient lifestyle,
attitude or knowledge of diabetes. These studies are useful because care
processes are considered to be part of the interventions which may affect patient
outcomes.

Conclusions

In conclusion, the above systematic reviews and studies have demonstrated
‘structures of care’ and some programmes of care can result in improved
processes and patient outcomes. However, the interventions themselves are
neither “standardised” nor always “quality assured”, so combination of
heterogeneous studies in systematic reviews may not give rise to meaningful
conclusions. Also, adherence to these interventions is variable but is often not
included in the analysis, hence ‘missing links’ seem to be present. Ideally, if
primary care is to provide similar quality of care to their diabetes patients as hospital outpatients do, then proper assessment of the structures processes of care delivery in the hospital setting should be studied, and replicated as closely as possible in primary care. As it hasn’t been, much of the knowledge we are building up slowly by research is piecemeal, and frustratingly elusive.

As the aim of interventions is to improve care outcomes, it would make more sense to study patient health outcomes rather than process outcomes. Care processes should be part of the intervention programmes, which in turn should be properly standardised and quality controlled before being tested on healthcare professionals and patients. Learning from the pharmaceutical industry, the drug in question had to pass different levels of laboratory testing before being tested in patients. Even then, different doses of the same drug could have different beneficial and harmful effects. If we view intervention programmes in the same light, then we can see the magnitude of confounding variables which the studies contain and realise how difficult it is to draw meaningful conclusions. Obviously, more high quality research is required.

Nonetheless, after a decade of research and publications, the thread of commonality would seem to be that care programmes are needed. These often take the form of professional education, development of locally agreed and relevant guidelines, dissemination and implementation of written guidelines, protected time for chronic disease management, regular audit & feedback, patient education and counselling, and clinical information systems (preferably computerised) to support administrative tasks of developing and maintaining patient chronic disease registers, prompting GPs and patients for regular recall or follow-up, structured diabetes templates for standardised review of patients, standard referral forms etc. Other more subjective issues include GP or practice nurse interest in diabetes, team working, communication between professionals, positive attitude towards change and quality improvement, and patient attitude towards their condition. Finally, there is development of software systems that may contribute to care improvement by prompting adherence to care guidelines.
Limitations of the literature review

These are not inconsiderable, and if questionable or flawed would completely discredit the whole review. Firstly, as I was the only searcher, assessor and reviewer, my own capability and experiences would affect the process of searching, selecting and appraising the evidence.

Secondly, despite using the CASP tool to assess methodological quality, there is no assurance that I was using it correctly. Thirdly, I have limited knowledge of statistics and would accept statistical analysis unquestioningly. Fourthly, the possibility of bias can also be introduced in my interpretation of what I was reading. In order for this literature review to be more quality assured, ideally there should be a team of experts undertaking it.

Development of question(s) for my research project

As mentioned earlier, the project would ideally combine my role in diabetes service development and improvement in Salford PCT, with my interest in health informatics. Much of the systems or programmes of care improvement (as described by current and previous research) have already been implemented in Salford (as discussed in Ch 1). Current improvement programmes include developing ‘the expert patient’ and computerised clinical information systems. Despite such achievements, there is audit data from the DIS (see Ch 1) to suggest that care is unequal and sub-optimal in Salford. Are the care processes not delivered, or do we have the same missing link(s) as some of the studies reviewed, or are there other factors yet unexplored which may account for the problem? I am keen to investigate the inequalities, find the reasons for them, bench-mark poorer performing general practices against better performing ones, make changes and develop standards in the service model for delivery of diabetes care, test them in the poorer performing practices and hopefully observe quality improvements in care, measured by patient outcomes.
I am also keen to investigate the role of computer clinical systems in achieving these quality outcomes. As seen in the literature review, computerised systems can improve process measures but have not demonstrated an improvement in patient outcomes. However, this could be explained by the way physicians respond to computerised prompts and recommendations (Grant 2003). Nonetheless, as with the other interventions, it is not a standardised or quality assured tool, and so should also be quality tested before use.

My research questions are “what factors affect diabetes care delivery in primary care in Salford?” and “what changes can be made to achieve quality diabetes care in primary care in Salford?” What this study will not try to identify are the other factors which could influence clinical outcomes of patients with diabetes, which are not part of the healthcare delivery system, e.g. patient demographics, and relationship to poverty and level of education etc.
Chapter Three
Methodology

Methodology

This study is an explorative one, gathering information to identify aspects of diabetes care provision which could affect patient outcomes, in Salford. The literature review has informed on what constitutes good quality care i.e. care that improves health outcomes. Now, information needs to be gathered about current care practices and outcomes, in Salford.

Aim

To identify and explore the factors which may affect diabetes care delivery in primary care in Salford.

Objectives

1. To carry out a baseline assessment in primary care to identify to current diabetes care quality (as measured by patient health outcomes) in Salford
2. To identify current diabetes care provision in primary care
3. To identify associations between care provision and care outcomes
4. To identify deficiencies in provision of diabetes care to the level of quality standards
5. To identify problems or barriers, and changes needed to achieve quality diabetes care

The purpose of this study is to provide the information, which can be used to develop or change service models in diabetes care delivery in primary care in Salford. As discussed in a previous module of this Health Informatics course
Factors affecting Diabetes Care Delivery in Primary Care in Salford (HAR6001), information is needed for healthcare management. Without information on its resources or desired output, organisations would not be able to plan strategically. This information can be either processed from relevantly collected data, or obtained as knowledge gained through experience or research. This study will be using collected data (from the DIS) and research to gain knowledge, for processing into information, useful for healthcare delivery.

Originally, I had planned to use action research to complete this study, so that initial findings (from above points 1-5) can be confirmed in the testing and evaluation of subsequent changes to be made.

Action research is an approach to research which aims at both taking action and creating knowledge or theory about that action (Susman & Evered 1978). It works through a cyclical process of:

- identifying a problem
- planning changes
- taking action
- evaluating that action
- future planning etc

This continuous and cyclical method (Argyris 1985) of planning interventions to improve practice, managed in real time, provide opportunities for effective action and contribute to the development theory of what really goes on in a system/organisation. However, due to various constraints (which I will discuss later) this study will provide information on issues rather than answers or solutions.

Method

The study was conducted using a mixed methodology of triangulation, a quantitative approach with data collected by a questionnaire and audit of data in
Salford’s centralised computerised diabetes database (DIS), and a qualitative approach with data collected by in-depth semi-structured interviews with primary care staff.

As mentioned earlier, systems or programmes of care improvement have already been implemented in Salford (see Ch 1). However, there has not been any formal evaluation of these interventions to assess their quality and success. I feel that the best way to study the identified variables, to confirm and benchmark quality care process, would be with the quantitative approach. This approach would give me information of which variables in care processes produce good clinical outcomes, in primary care in Salford.

A standard structured questionnaire was developed (see appendix 3) and sent to all GP practices in Salford. The close ended questions reflect ‘quality’ features of diabetes care, as identified in the literature review e.g. professional education, regular audits & feedback, having a specific diabetes clinic, computerised clinical information systems, regular recall and review, structured diabetes templates for standardised review of patients, individual management plans, use of protocols or guidelines for diabetes care, nurse involvement, patient education. I had piloted this questionnaire amongst fellow GPs practising outside Salford, to refine the questions so that ambiguity would be minimised.

Using data from the DIS, patient outcomes can be analysed or audited to assess the quality of diabetes care delivered by each GP practice. Then statistical analysis can be used to find association between effects of variables of care provision and patient outcomes. This quantitative approach examines the cause and effect relationships identified through existing knowledge.

Other more subjective issues, which may influence quality of care, include team working, communication between professionals, positive attitude towards change and quality improvement, and patient attitude towards their condition. These are difficult to elicit in a questionnaire, so I felt that the qualitative approach was more appropriate. In-depth interviews with open-ended questions would be used,
Factors affecting Diabetes Care Delivery in Primary Care in Salford
to assess perceptions of primary care staff on strategies and resources which
contribute, barriers that cause problems and changes which need to be made to
enable successful outcomes in care. This approach enhances the former by
placing its data into meaningful social contexts, gaining rich and insightful details
on complex issues, which could not be identified from the questionnaire.

An interview schedule was developed (see appendix 4). There were 5 standard
questions on the schedule and these were open-ended. This design ensures that
these major questions would be asked, but then other probing questions could
develop depending on initial answers that the respondents provided. The aim was
to frame the interview so that respondents were free to express themselves as
much as possible, but prompted to provide as much useful information as
possible, in an environment which resembles a conversation rather than an
inquisition. These interviews would be taped, transcribed and subjected to
thematic analysis.

Sampling for the interviews were purposefully decided from the audit results.
Using surrogate measures of patient outcomes e.g. HbA1c, BP and cholesterol
levels, practices were divided into better and worse performing practices. The
best and worst performing practices were invited to give in-depth interviews. I
decided to recruit 10% of the top performing GP practices, and 20% of the bottom
performing practices, as barriers are often more numerous than success factors, in
general. Also, the purpose of the study is to implement changes in under-
performing practices to bring equality into diabetes care.

Ethical issues

Ethical issues had to be taken into consideration. Individuals have a right to
refuse participation in the study. Participants have a right to privacy and
confidentiality, and should not be harmed or disadvantaged as a consequence of
participation. An information sheet was prepared (see appendix 5) detailing
expectations and commitment for the study. All patient sensitive material would
be anonymised, as would the interviewees and the surgeries.
As I had initially intended to do the study as an action research, documents prepared for application for ethical approval were written to include the testing of resultant service models for diabetes care delivery and then further evaluation of changes. All details of the entire action research study were included in the application for ethical approval and submitted along with the information/consent sheet, in July 2002. However, ethical approval was considered to be un-necessary by the Local (Salford & Trafford) Research Ethical Committee and I was free to proceed with my study.

**Planned Data Analysis**

Data from the DIS would be audited to assess quality of diabetes care, using the surrogate measure of HbA1c (glycaemic control). Data collected by the questionnaires would be combined with audit results of data from the DIS, and analysed using Microsoft Excel and SPSS. Using statistical testing, differences in care outcomes and associations between care outcomes and variables of care provision could be identified.

Data collected by the interviews was subjected to thematic analysis. There are various approaches to analysing qualitative data. ‘Grounded theory’ is the process of generating theory from data which has been systematically gathered & analysed. Glaser & Strauss (1967) maintains that ‘generating a theory from data means that most hypotheses & concepts not only come from the data, but are systematically worked out in relation to the data during the course of research’.

In sociology, there is often interplay between qualitative research observations, the development and refinement of the hypotheses, and consequently the categories to be used in the analysis. The aim of analysis is to produce a detailed and systematic recording of themes and issues addressed in the interviews, and to link the themes from the interviews together under a category system. The categories for coding the data are often developed during and after the data collection phases (Bowling 2002). Bowling suggests that theory is inductively derived from study of the phenomena it represents, thus data gathering and analysis has a reciprocal relationship with theory, and that theories do not have to
Factors affecting Diabetes Care Delivery in Primary Care in Salford

be causal explanations. Fielding (1993) describes ‘coding down’ – codes chosen to represent the theory being researched, and ‘coding up’ – categories developed from data. ‘Content analysis’ (Babbie 1979, Fox 1982) and thematic content analysis (Burnard 1991) are adapted from ‘grounded theory’ approach and involves coding up’.

**Thematic content analysis** (Burnard 1991)

1. notes made at interviews serve as memory joggers, and records ideas and theories
2. transcripts read through and notes are made, aim to be immersed in the data
3. transcripts read through again, and ‘open coding’ applied i.e. all usable data coded
4. list of similarly coded data grouped together under a heading i.e. heading developed
5. repetitive headings develop themes or categories
6. use colleagues to generate categories independently, guard against researcher bias (validity but unable to check with interviewees – too much time)
7. re-read transcripts, code with categories e.g. with different highlighting pens
8. cut and paste into appropriate headings
9. then write up various headings, categories, or themes

I plan to use methods of ‘coding up’ data to develop themes and categories for a narrative presentation.
Chapter Four
Quantitative analysis and results

Quantitative analysis and results

This chapter presents the results of the quantitative approach to developing hypothesis. As mentioned in Ch 3, a standard structured questionnaire was developed (see appendix 3) and piloted. The questions were mainly close-ended ones, the majority with yes/no answers. The aim of the questionnaire was to find out which variables in care provision were delivered in each GP practice in Salford:

- a specific diabetes clinic
- computerised clinical information systems
- regular recall and review
- structured diabetes templates for standardised review of patients
- use of protocols or guidelines for diabetes care
- patient information and education
- professional education
- healthcare professional interest in diabetes care
- diabetes team meetings
- regular audits & feedback

The questionnaire was sent to all the GP practices in Salford, a total of 61. 54 were returned, achieving a response rate of 88%. Data returned was entered into Microsoft Excel for manipulation. Patient outcome data from the DIS was audited, using the surrogate measure of HbA1c (glycaemic control) to assess the quality of diabetes care. Good glycaemic control is reflected in values of HbA1c < 7%, i.e. ‘treating to target’. So, the quality of care for each GP practice can be assessed or measured by the proportion of diabetic patients treated to target. There was patient data from 56 practices. This information on glycaemic control
was added to information collected from the questionnaire, to provide a combined set of data for 44 practices.

This combined data was transferred from Microsoft Excel to SPSS, and subjected to statistical testing. Variables of care provision were looked at and various statistical tests were applied, depending on the type of data and groups of population sampled. The independent (2-sample) t-test was used to compare the mean levels of glycaemic control in 2 groups (yes/no), and one way analysis of variance (ANOVA) was used to compare the mean levels of glycaemic control in > 2 groups. The Pearson correlation coefficient was used to look for association between continuous variables e.g. practice size or number of patients with diabetes, and levels of glycaemic control. Initially, I had planned to use logistic regression to study associations between care outcomes and the variables of care provision. However, most of the care variables do not appear to have statistically significant effect on care outcomes (see results) so that I was unable to carry out further testing on the data.

Results

Data was available from 44 out of the 61 practices in Salford, i.e. 72%. The total number of patients in these 44 practices was 164552, and the total number of patients with diabetes in this population was 4607, giving a prevalence of 2.8%. An average of 65% of patients with diabetes had an annual review (total n = 2992), and of these patients, 77.8% had their HbA1c measured (total n = 2327). See table 4.1 (below).

Table 4.1 (below) shows the minimum, maximum and mean number of:

- patients in a practice (labelled ‘Pract size’)
- diabetic patients (labelled ‘DM patients’ and ‘DM prevalence’)
- diabetic patients attending for annual review (labelled ‘DM patients AR’)

Dr Karen Lim
Factors affecting Diabetes Care Delivery in Primary Care in Salford

- diabetic patients who have had their HbA1c measured in a review (labelled ‘HbA1c measured’)
- diabetic patients with HbA1c treated to target (labelled ‘tgt HbA1c’)

The frequencies in table 4.1 are presented in the histograms (1-9) below. The proportion of HbA1c treated to target (expressed as a percentage of HbA1c measured) is the surrogate measure for the quality of diabetes care. This care outcome measure varies from 0% of diabetic patients treated to target in the worst practice, to 55.5% in the best practice, with 29.4% of diabetic patients treated to target in the average practice.

Table 4.2 (below) shows the frequencies of practices having various features of diabetes care provision:
- computerised diabetes register (DM register)
- a specialist diabetes clinic (DM clinic)
- annual recall for diabetes review (DM recall and review)
- GP interest in diabetes
- PN interest in diabetes
- diabetes team meetings (DM team meetings)
- diabetes audits (Audits)

Table 4.3 (below) is the frequency table showing occurrences of diabetes review i.e. how frequently it is carried out (labelled ‘DM rev freq’) e.g. every 3 months (3m), 6 months (6m) or 12 months (12m).

Table 4.4 (below) is the frequency table showing length of appointment times for the review (labelled ‘DM appt length’) e.g. 10 minutes (10m), 15 minutes (15m), 20 minutes (20m) or 30 minutes (30m). These frequencies are represented in the pie charts (below).
Factors affecting Diabetes Care Delivery in Primary Care in Salford

Frequency tables

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<th>DM patients AR</th>
<th>% DM AR</th>
<th>% DM AR measured</th>
<th>% measured HbA1c</th>
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<tr>
<td>Median</td>
<td>2915.00</td>
<td>86.00</td>
<td>2.896</td>
<td>66.50</td>
<td>85.763</td>
<td>50.50</td>
<td>79.706</td>
<td>14.00</td>
<td>29.000</td>
</tr>
<tr>
<td>Minimum</td>
<td>1092</td>
<td>22</td>
<td>.9</td>
<td>21</td>
<td>22.5</td>
<td>6</td>
<td>28.6</td>
<td>0</td>
<td>.0</td>
</tr>
<tr>
<td>Maximum</td>
<td>10659</td>
<td>298</td>
<td>5.1</td>
<td>156</td>
<td>100.0</td>
<td>128</td>
<td>95.9</td>
<td>71</td>
<td>55.5</td>
</tr>
</tbody>
</table>

Table 4.1

<table>
<thead>
<tr>
<th></th>
<th>DM register (computer)</th>
<th>DM clinic</th>
<th>DM recall and review</th>
<th>GP interest in diabetes</th>
<th>PN interest in diabetes</th>
<th>DM team meetings</th>
<th>audits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>yes</td>
<td>25 (56.8%)</td>
<td>21 (47.7%)</td>
<td>43 (97.7%)</td>
<td>24 (54.5%)</td>
<td>37 (84.1%)</td>
<td>4 (9.1%)</td>
</tr>
<tr>
<td>no</td>
<td>18 (40.9%)</td>
<td>23 (52.3%)</td>
<td>0</td>
<td>20 (45.5%)</td>
<td>7 (15.9%)</td>
<td>39 (88.6%)</td>
<td>15 (34.1%)</td>
</tr>
<tr>
<td>Missing</td>
<td>1 (2.3%)</td>
<td>0</td>
<td>1 (2.3%)</td>
<td>0</td>
<td>0</td>
<td>1 (2.3%)</td>
<td>15 (34.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>44 (100%)</td>
<td>44 (100%)</td>
<td>44 (100%)</td>
<td>44 (100%)</td>
<td>44 (100%)</td>
<td>44 (100%)</td>
<td>44 (100%)</td>
</tr>
</tbody>
</table>

Table 4.2
Factors affecting Diabetes Care Delivery in Primary Care in Salford

### DM rev freq

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>2</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>12m</td>
<td>11</td>
<td>25.0</td>
<td>25.0</td>
<td>29.5</td>
</tr>
<tr>
<td>3m</td>
<td>6</td>
<td>13.6</td>
<td>13.6</td>
<td>43.2</td>
</tr>
<tr>
<td>6m</td>
<td>25</td>
<td>56.8</td>
<td>56.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3

### DM appt length

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>1</td>
<td>2.3</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>10m</td>
<td>3</td>
<td>6.8</td>
<td>6.8</td>
<td>9.1</td>
</tr>
<tr>
<td>15m</td>
<td>19</td>
<td>43.2</td>
<td>43.2</td>
<td>52.3</td>
</tr>
<tr>
<td>20m</td>
<td>16</td>
<td>36.4</td>
<td>36.4</td>
<td>88.6</td>
</tr>
<tr>
<td>30m</td>
<td>5</td>
<td>11.4</td>
<td>11.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.4

### Histograms

1. Practice size

- Std. Dev = 2348.21
- Mean = 3739.8
- N = 44.00
Factors affecting Diabetes Care Delivery in Primary Care in Salford

2. Patients with Diabetes

![Bar chart showing frequency of patients with diabetes.](chart1.png)

- **Frequency**
- **Mean = 105.5**
- **N = 44.00**
- **Std. Dev = 65.40**

3. Diabetes prevalence

![Bar chart showing frequency of diabetes prevalence.](chart2.png)

- **Frequency**
- **Mean = 2.89**
- **N = 44.00**
- **Std. Dev = .82**

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4. Diabetes Annual Review

DM patients AR

5. % DM Annual Review

% DM AR
Factors affecting Diabetes Care Delivery in Primary Care in Salford

6. HbA1c measured

7. % HbA1c measured
Factors affecting Diabetes Care Delivery in Primary Care in Salford

8. HbA1c to target

Target HbA1c

9. % HbA1c to target

Frequency

0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0

% target HbA1c

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Factors affecting Diabetes Care Delivery in Primary Care in Salford

Pie Charts

1. DM review frequency

- 30m
- 20m
- 15m
- 12m
- 6m
- missing

2. DM appointment length

- 30m
- 20m
- 15m
- 10m
- missing

Dr Karen Lim 48
Statistical testing

The various factors of diabetes care provided by the GP practices studied, as in table 2, produced data which fell into 2 groups. The independent t-test was used to compare the 2 groups to determine if there was statistical significance between the care outcomes of these groups. Some factors of care were excluded from testing as all the practices seem to be providing them e.g. annual recall for diabetes review, use of protocols or guidelines for diabetes care, and provision of patient information and education. However, computerisation of the diabetes register, having a diabetes clinic, a PN interested in diabetes, diabetes team meetings or audits, did not seem to have any statistical effect on the care outcomes. Practices with a GP who was interested in diabetes, did have better outcomes than those without. This result was statistically significant (p < 0.05).

The factors, as in tables 4.3 and 4.4, produced data which fell into 3, or more, groups. The one way analysis of variance (ANOVA) was used to determine if there was statistical significance in the care outcomes of these groups.

Practices which carried out more frequent diabetes reviews seem to have better care outcomes (see table 4.5), but this effect was just short of statistical significance (p = 0.56). However, practices that have longer appointment times for the reviews seem to have worse care outcomes, but this was not statistically significant.

<table>
<thead>
<tr>
<th>Review Frequency</th>
<th>No. of practices</th>
<th>Mean % target HbA1c</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 months</td>
<td>6</td>
<td>38.3</td>
</tr>
<tr>
<td>6 months</td>
<td>25</td>
<td>28.5</td>
</tr>
<tr>
<td>12 months</td>
<td>11</td>
<td>26.9</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>29.5</td>
</tr>
</tbody>
</table>

Table 4.5
Factors affecting Diabetes Care Delivery in Primary Care in Salford

The practice factors, shown in table 4.1, were tested using the Pearson correlation coefficient to look for associations with care outcomes. There is no association between practice size and care outcomes, nor between number of diabetic patients or prevalence of diabetes, and care outcomes. Although there appears to be some correlation between the number of diabetic patients in a practice having an annual review and care outcomes, this is not seen between the percentage rate of diabetic patients in the practice having an annual review, and care outcomes. However, there is association with both measuring and percentage rate of measuring HbA1c, and care outcomes. See table 4.6 and scatter diagrams below.

Table 4.6

<table>
<thead>
<tr>
<th></th>
<th>% target HbA1c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice size</td>
<td>-.052</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td>DM patients</td>
<td>.022</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td>DM prevalence</td>
<td>.165</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td>DM patients AR</td>
<td>.330*</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td>% DM AR</td>
<td>.223</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td>HbA1c measured</td>
<td>.384*</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td>% HbA1c measured</td>
<td>.441**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
</tr>
</tbody>
</table>

* correlation is significant at the 0.05 level (2-tailed)

** correlation is significant at the 0.01 level (2-tailed)
Factors affecting Diabetes Care Delivery in Primary Care in Salford

Scatter Diagrams

DM patients AR

HbA1c measured
Despite the differences in care outcomes, in the practices studied, the quantitative study was unable to elicit the reasons for these differences. The care processes studied do not seem to account for the inequalities in care outcomes. However, these results will be discussed in chapter 6, in relation to Ch 5.
Chapter Five
Qualitative analysis and results

Qualitative analysis and results

This chapter presents the results of the qualitative approach to developing hypothesis. As described in Ch 3, an interview schedule (see appendix 4) was developed with questions designed to capture primary care staff perception of the diabetes care they offered, their strengths & weaknesses, opportunities & barriers. Based on the results of the audit (from the DIS data), purposeful sampling was from the best and worst performing GP practices. From the cohort of better performing GP practices (which I shall refer to as group A), 5 consented to take part, and from the worse performing GP practices (which I shall refer to as group B), 12 consented to take part.

Initially, I had planned to interview 3 staff members (a General Practitioner, a Practice Nurse and the Practice Manager) from each participating GP practice, in a focus group interview. However, there were logistic problems arranging all 3 staff members to be interviewed together, and the time factor did not allow for individual interviews of each of the 3 staff members for all 17 surgeries. GPs were the first point of contact, but most of them referred me onto their PNs, who was responsible for diabetes care. This resulted in one-to-one interviews conducted with the PNs, with the exception of 2 surgeries; 1 was conducted with the GP, and the other with all 3 staff members. These interviews were taped and later transcribed. Field notes were also taken, to capture themes and ideas which emerge from the interview, and also to provide back up for tape-recording failure.

Analysis and preparation of data was done by being thoroughly familiar with the data. The process is iterative, as it based on grounded theory. A thematic framework was developed, to order and manage, extract and interpret data, and summarise data in a chart for easy analysis. Concepts, categories and themes for coding are derived from data analysis, as well as from ideas which emerge while
Factors affecting Diabetes Care Delivery in Primary Care in Salford

conducting and listening to interviews. Concepts and categories developed during data collection are tested with more data collection until the topic is understood. Also, repeated reading of the field notes and transcripts is done, to identify emergent or key themes. The data is organised by topics or categories then themes are code into categories (through a ‘cut and paste’ process – see below) while research is in progress. This continuing process stops when theoretical saturation is reached and nothing more is added to be topic.

**Coding steps** (Bowling 2002)

1. highlight significant features and quotes i.e. code pieces of text
2. code answers each question before moving on to next question
3. develop categories, by changing and refining, when new or different codes emerge, until no new categories generated
4. sort data - cut and paste each code under the relevant category(s)

**Results**

The emergent themes or categories are presented in a narrative and supported by quotes. They are presented in 5 key areas or headings:

1 **Healthcare professionals**

The following themes or issues were raised for the primary care healthcare professionals delivering diabetes care. This included not only the practice nurse (PN), and the general practitioner (GP), but also the district nurses (DNs).
1.1. Interest, motivation and attitude

Most respondents perceived that healthcare professional interest in diabetes care was important for good care outcomes. It was felt that an interest in good diabetes care would motivate the clinician or healthcare professional to:

- make diabetes care a priority and take it seriously
- attend meetings, keep up to date with education and develop a level of expertise
- be aware of existing or new local services and use them appropriately
- be aware of the disease signs and symptoms, be quick to screen for it and pick it up opportunistically
- have the right attitude to persist in spending time and effort in offering care to patients despite patient non-attendance, non-compliance and poor care outcomes
- be active and aggressive in managing the disease i.e. in making changes in patient lifestyle, initiating and stepping up treatment (in line with current guidelines)

A respondent, from group A, felt that the lack of motivation is a barrier to good care.

“…interested and educated (practice) nurses and GPs. It’s all down to staff at the end of the day”.
“…having a keen interest in diabetes, and organising thoughts so that nothing gets missed out…”
“…making diabetes care a priority…”
“…not playing down the disease…”
“…interested (clinician) who also has the level of expertise and is up to date…”
“…poorly educated and poorly motivated clinicians move patients faster along the continuum towards hospital care inappropriately…”
“…chasing up on appointments with patients…”
“…devoting time and effort towards offering diabetes care, despite not hitting targets, and having patients who do not take up the offered care…”
“…must carry on to do everything, because every little thing (patients, targets, controls) caught is worth it…”

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“…aggressive or strict attitude towards patient’s lifestyle e.g. smoking, diet and exercise…”
“…being more aggressive about initiating and stepping up treatment…”
“…zero tolerance, towards smoking, inadequate blood pressure or glycaemic control…”

1.2. Education, knowledge and confidence

Again, most respondents perceived that education and knowledge of diabetes and its management was important for good care outcomes. It was felt that education should be offered to all GPs, PNs and DNs who looked after diabetic patients, and that this education should ideally be standardised (e.g. with the Warwick course, the current standard in diabetes education) and updated (e.g. through educational meetings or outreach). The purpose of education is to acquire knowledge about diabetes and its management, and so be able to practise with confidence. Most PNs who had attended the Warwick course said that although their knowledge may not have increased much, confirmation that they had been doing the right things, had increased their confidence. One nurse felt that she still needed to know a lot more, despite having completed the Warwick course.

“…should have a course for the DNs to attend like the PNs do, like the ENB or Warwick”.
“…educational updates to PNs & DNs and consolidation of knowledge on diabetes”
“…interest of nurses and GPs who keep up to date by attending meetings…”
“…with good knowledge of diabetes and confident with diabetes care…”
“…being more aggressive about initiating and stepping up treatment, for example with blood pressure control, stepping up the treatment every 2 weeks, as in the Salford diabetes guidelines…”

A respondent from group A felt that that the lack of knowledge is a barrier to good care. This same person, a GP, also felt that the GP (rather than the nurse) should be
the primary care clinician responsible for an overview of care for the diabetic patient, pulling together all the clinical information to make the final management plan e.g. whether to treat blood pressure, at what level and what with (e.g. in an asthmatic) whether to add aspirin, or whether the patient requires a referral for specialist care.

Most of the interviewees felt that these issues were important. However, a respondent from group A felt that although education, knowledge and confidence in diabetes management were important, interest was not, since diabetes management was only a part of the job, and there were lots of other disease areas and things to do.

1.3. Specialisation

Finally, the issue of specialisation in primary care was raised by a PN, from group B. She was the only respondent to raise this issue. She felt that there should be development of the expert PNs as well as GPs with special interests (GPSIs). The reasons for this is that generalists cannot be good at all fields of medicine, so that specialisation in primary care could be the answer to offering better diabetes care in primary care.

“…move from generalist to specialist because you can’t do everything well, so ultimately (there will be) practices which GPs have opted out of diabetes care”.
“…can’t go down the old road, need new ways of working… in offering diabetes care, especially with new contract…”
“…must diversify especially in these days of litigation, and can’t be all things to all men”
“Expert nurses, as part of expert training, can see their own limitations and see where the problems need referring on (to secondary care)...”
2 Patients

Many of those interviewed felt that patients themselves affect the quality of diabetes care, because they can be “difficult”, “disinterested” and “persistent non-attendees”. The following themes were identified:

2.1. Information and education

This is a common theme amongst respondents. Nearly all respondents perceive that patients should be educated about their own disease condition. The reasons are for them to understand about diabetes and its health implications (see Ch 1 background and context) if not properly cared for, to take diabetes care seriously and so take responsibly for it, and also to realise that they can take control of it and not be fearful of their own disease. Respondents mentioned different ways of offering diabetes education e.g. in patient education sessions (group), through good quality literature and leaflets, and regularly built up during their clinic reviews (personal). A few respondents also mentioned providing information about access to services for diabetic patients. Two nurses also mentioned that patient education and information should be standardised and quality assured (this is discussed again under the 4th heading - see below) so that different information doesn’t confuse patients.

“…need as much information as possible and need to make them realise that if diabetes not cared for properly, they not us will be affected….what the consequences are…”
“…understand about diabetes…that it is a serious disease and they need to take diabetes care seriously”
“…education and reinforcement of advice…until they feel comfortable…”
“…patient education sessions…with input from others, like the podiatrists, dieticians, DSNs (diabetes specialist nurses)…”
“…actually turning up for their reviews or appointments – to have education…”
“…knowledge and information could be built up…”
“…constant and on-going education, dripping it through instead of bombarding them with information…”
“…different information given to patients confuse them…so good quality and standardised information…”

2.2. Responsibility and compliance

All respondents perceived that this is an important issue. The respondents feel that patients do need to take responsibility for looking after themselves, by even just turning up for their diabetes review, to be educated about diabetes and to allow the clinicians to offer appropriate diabetes care. The respondents also feel that patients need to be compliant with lifestyle advice and taking prescribed medication. Some feel that their patients think they are doing the healthcare professionals a favour when they do turn up for appointments or comply with treatment. Others feel that good diabetes care can be achieved when patients attend regularly for diabetic reviews and are compliant with their diabetes management. Respondents from both groups express this view.

“…patients can be difficult…”
“…pretend it (diabetes) is not there, so that they don’t need any care.”
“…make excuses not to attend…”
“…do not take up offered care…”
“…actually turning up for their reviews or appointments so that they can have education, and allow the clinicians (to manage their diabetes)…”
“…hard to tell patients that it is their disease and they must take responsibility for it, especially the elderly, who want care to be given by the professional, and want praised if they have followed instructions…”
“…patients takes more responsibility for looking after themselves not just leave it all to us…”
“…good attendance…patients come regularly”
“…compliance with treatment…”
“…coming in for reviews and being compliant with advice and treatment…”
2.3. **Interest, empowerment and self-management**

This is an area of current interest and Salford PCT is in the process of running courses to develop the ‘expert patient’. However, none of the respondents actually mention this. Half the respondents perceive that patients should be interested in their own disease or health in order, to be empowered to achieve good care, by attending appointments, managing lifestyle changes, and complying with treatment. Some feel that patients’ lack of interest may be due to denial of the seriousness of their disease, and others that it is due to their awareness of the seriousness of their disease, and so feel discouraged or depressed by it all. A few respondents feel that patients’ lack of interest in their own disease or health is a barrier to good care.

“…patients may not realise how important it is, but then they see a programme on TV and realise they can go blind or their legs can come off, so they want to start a proper diet, or lifestyle and exercise, and stop smoking …”

“…some still not interested so we just have to ‘bat along with them’, and some don’t see it as a problem…”

“…seem to be in denial of the seriousness of the disease, or pretend it is not there…..”

“…sometimes, patients are fed up with it all, despite advice from professionals. They may be depressed, or may be difficult patients (many concurrent problems, medical or otherwise) and don’t care, making excuses not to attend…”

“…even if they are good with compliance can grow deflated…”

“…can’t be mithered…“

“…unable to offer quality service to disinterested people…”

“…unable to force patients to be empowered…”

“…patients’ attitude towards disease cannot be legislated…”

Although most respondents mentioned the first 2 themes, only half the respondents seem to feel that patient interest in their own disease was an important factor in achieving good diabetes care.
3 Structures and infrastructures

The 3 themes, which I have included under this heading, are buildings, computerisation and diabetes clinics.

3.1 Buildings/premises

There were 3 practices in rather cramped and unsuitable premises e.g. a small terrace house or buildings that have run out of space for needed extensions. There are 2 from group B, and 1 from group A. Naturally, the respondents from the cramped surgeries perceived that they would be able to offer better care with improved building space and rooms. None of the other respondents mentioned this theme as an issue or factor for improved diabetes care.

“…currently in converted terrace housing, looking forward to new purpose built complex due in 1.5-2 years…”
“…lack of space, computer terminals, rooms, finances…”
“…need more room or a new surgery – all the rooms and computers currently shared by GPs, PNs and midwives etc. Plans for new building are proceeding, but where? – we can’t find a place to have a new surgery…”

3.2 Computerisation

Respondents mentioned this theme more than the other two themes under this heading. This theme discusses the use of computers for systems and processes, rather than the actual information systems (this is discussed under the 4th heading - see below). Although all the practices possessed computers, some of them used their computers as information systems while others use them for mechanisation of administrative tasks e.g. printing rather than writing prescriptions. For these practices, their information systems were still paper based, but were looking forward to them being IT based. They felt that it would save time because
administrative tasks could be automated. One respondent felt that it would make audits possible, and so improve care.

Other advantages include being able to print patient information leaflets (PILs) from approved websites, have diabetes management templates on the system, so that information is automatically coded and filed while the clinician is working his/her way through the necessary care processes. This involved having clinical systems computerised and these respondents feel that for IT based systems to be used successfully, the appropriate software needs to be installed, and adequate training of users is important. Salford PCT has GP IT facilitators to set up information systems for healthcare professionals and then train them to use these. However, computerisation itself is also seen as an issue, and much effort is still needed to move from being paper based to being computer based.

“…..getting infrastructure in place and waiting for notes to be summarised before able to get rid of hand-written notes…”
“…..need to trawl through paper-based patient notes to input information on computer, then set up computerised recall system, then start aiming for clinical targets…”
“…automatic filing of data input…automated recall for review…computer can generate recalls…”
“…no need to input and easier for auditing…”
“…good audit material is only available if input quality has been good…”
“…audits requires that everything is on the computer…can’t improve care without audits…”
“…printable computer materials are also useful for patient education…”
“…good IT template for chronic disease management…”
“…IT template for care…can see when last done and when next needs doing…auto prompts…”
“…diabetes management template and graph facilities…”
“…details – patient information, investigation, results and processes of care on the management plan template…on the same screen/window, no need to toggle backwards…also helps with running audits…”
“…training provided to help staff be proficient with computerisation…not adequate…”
“…notes summarising and input into the computer, updating the IT templates…”
“…even entry on the computer can be difficult because the right code is needed…”
“…IT need to sorting out, like who does what…data input clerk to input blood results…not a nursing job…”
“…good and helpful IT facilitators…”

3.3. Diabetes clinics

Several respondents mentioned this, although consensus for its existence is not agreed. Respondents who did or didn’t run diabetic clinics came from both groups. Most were happy with their present arrangements. However, a few who didn’t run a diabetes clinic, were thinking of setting up one. One mentioned a ‘one-stop shop’ (see quotes below). Positive reasons for having a diabetes clinic include being able to concentrate on diabetes care, having relevant healthcare professionals together and allowing collaborative care (applicable to ‘one-stop shop’), giving patients access to all the relevant healthcare professionals at one visit (rather than making individual appointments for each), and conveying the idea that diabetes is a serious disease if specific diabetes clinics exist. The only reason for not having a diabetes clinic is to allow patients the flexibility of choosing their own appointment times (rather than being restricted to the day of week on which a specific clinic would run).

“…so I can have my diabetes hat on…”
“…easier and better because I are able to concentrate more, and have things (equipment and leaflets etc) set up ready…”
“…for the GP and (practice) nurse to run clinic together, or for the GP to have free slots in between other patients for diabetes queries while (practice nurse runs diabetes clinic….”
“…specific diabetes clinics and having the podiatrists in at the same time…”
“…there is collaboration and learning…”
“…one stop, in-house podiatrist, dietician, optometrist, specialist-run diabetes clinical and education sessions (for both patients and primary care staff), weight management clinics…”
“…protected time to be running diabetes clinics in the surgery. It conveys the idea that it is a serious business and patients take diabetes care seriously…”
“…working well without forcing patients to a set clinic…a set clinic may put some patients off attending”

4 Systems and processes

This heading includes care processes, some of which have been organised into well-established systems e.g. management and information systems. Other processes that have not been as well defined are discussed as individual themes e.g. access to care, communication, relationships and team working.

4.1. Systems within the surgery

These systems include those for organising chronic disease care, i.e. a management system, as well as administrative work whether clinical, secretarial or managerial i.e. an information system. Most GP practices have developed a management system for organising chronic disease care, as this has been well researched and presented (see literature review) in the past decade. These systems usually involve using a diabetes register for systematic and regular recall of patients for structured review of their diabetes care, and ensuring that patients who do not attend (DNAs) are ‘chased up’. Others include systems of screening for new cases of diabetes, or regular use of audit & feedback to improve care. Information systems usually support management systems, and again most GP practices have these in place. As mentioned earlier (section 3.2), these systems may be computerised or paper based. In diabetes care, these usually include developing and maintaining a diabetes register, recording information of patient
reviews (e.g. diet, weight, BP etc) with dates for follow-up appointments, and sometimes structured templates for reviews, to ensure that various care processes have been carried out and recorded.

For this theme, there is a difference in the issues raised by both groups. Respondents from group A feel that screening for diabetes is an important part of diabetes care, and that frequent and regular reviews of their diabetes patients, adherence to guidelines or systems, and ensuring good teamwork should improve care. This group of respondents doesn’t mention the importance of having good systems. There is the implication that they have already developed good systems, but it is the adherence to these systems, which is important for good care.

“...getting patients in early, good for patients but obviously more workload…”
“...regular review of patients – 3 monthly …diabetes is well controlled…patients don’t have to wait too long between appointments…”
“...receptionists stick to practice guidelines, for making follow-up appointments, recalling patients…good teamwork…”
...data input clerk to input blood results…not a nursing job…”

Respondents from group B raise different issues, mentioning the importance of keeping good records, having a diabetes register, having a recall and review system with having prompts and reminders, having management templates for review, preferably all computerised. Other issues discussed are developing practice protocols and systems of team working, with the “right people doing the right jobs”, and doing audits. This group of respondents seems in the process of developing effective systems of working.

“...good notes…if computerised, may be easy to trawl …”
“...effective register and recall system…”
“...IT systems for register, recall for review, auto prompts or reminders for patient care e.g. blood tests or BP measurement…”
“…unable to do without management plan or template to work through - reminds me of all the things I need to do for my diabetic patients…”
“…template for care so that nothing is missed out, can see when last done and
when next needs doing…”
“…practice protocols, with standardised ways of doing things like delivery of
care, or dealing with letters and results, or information for patients…”
“…difficult having GPs or bosses who want different things, think differently and
have different ways of doing things”.
“…data input clerk …phlebotomy…”
“…can’t improve care without audits, could be bobbing along thinking you’re
doing just great, then along comes a group of patients we don’t know anything
about…”
“…audits could highlight the work that needs to be done, otherwise there are so
many other things to think about…”
“…helps me to target patients whose care have not reached targets, and might not
have been seen in the past 12-18 months…”
“…..if audits were done regularly e.g. 6 monthly, then things can get picked up
and dealt with, we’ll be able to keep on top of things – more manageable than
annual audits which would highlights a lot of things to be done…”

Both groups of respondents mentioned patient information and more specifically
patient information leaflets (PILs). They feel that giving out quality assured
information and PILs would improve care. Both groups have respondents who
feel that there is a need for continual improvement.

“…always looking for ways to improve to do things better what works e.g. from
other practices…”
“…thinking of systems of management in my dreams…” (a quote from the only
practice manager I managed to interview)

4.2. Access

This theme looks at access to specialist care (e.g. intermediate care, secondary
care, podiatrists, dieticians, optometrists) for advice, help in dealing with minor
problems or major management queries. Most respondents feel that this is an important issue. Problems arise because a specific facility is poorly developed and not available (e.g. podiatry or phlebotomy), or that gaining access is difficult (e.g. DSN not available when needed, housebound patients) or the system of share care between GPs and diabetologists doesn’t work because patients can’t seem to access either.

“…being able to contact a GP or Hope (Hope Hospital Diabetes Centre) for emergencies…”

“…specialised support, for example from the diabetes community team, to give advice about managing the more complicated diabetes patients, when the relevant GP doesn’t have that knowledge…”

“…difficult to access…diabetes specialist nurses, podiatrist, dietician…”

“…communication with diabetes team at Hope hospital,…be able to ask advice from an expert team…”

“…diabetes team…to help with minor complications or offer helpful advice, as well as to refer to…”

“…being aware of the local existing services and using them, such as the diabetes locality based education sessions…”

“…share care with hospital doesn’t work, patients fall into the gap…”

4.3. Communication for continuity of care

This theme is about communication between clinicians within the practices or primary care (including DNs), with those in intermediate care and secondary care, podiatrists, dieticians, optometrists, nursing home sisters etc. It is felt whilst communication is important for continuity, and hence consistency, of care, it is often poor. Respondents from both groups raised similar issues i.e. having practice meetings and links with secondary/specialist care, nursing home staff, DNs and even optometrists. Hand held records are suggested as a way of ensuring that all relevant information is recorded and seen.
“…meetings to discuss care of specific patients with problems and have standard/same practice and advice/information…”
“…what happens with diabetes care in hospital…”
“…copies of letters from hospital to all (GPs & PNs) who care for the patients…”
“…hospital - not seem to have time for their diabetic patients, find it very difficult to get through on the phone, always seems to be busy…waits…poor communication…”
“…dedicated phone line (for PNs, GPs or DNs) to get hold of DSNs, or a specific time for an answering service…”
“…links with the community team…not comfortable with looking after patients on Insulin…so like to be able to contact the DSNs…”
“…be able to have access to and speak to one another e.g. with the dieticians and podiatrists…”
“…unable to be sure that patients have gone for their annual eye check…”
“…good relationship and communication with the nursing home sisters, and DNs means that I can be sure that housebound patients are still receiving diabetes care…”
“…hand held records to see input from all the relevant people looking after the patient…”

Only 1 respondent confirmed that the GP practice has weekly meetings to discuss patient care (not specifically diabetes), and she is from the best performing (highest HbA1c to target, in Salford) GP practice.
4.4. **Relationship and teamwork**

This theme is discussed in 2 separate headings, looking at relationship between different healthcare professionals, and between the primary care healthcare professional and the patient.

4.4.1. **Interprofessional**

For this theme (as for 4.1), there is a difference in the issues raised both groups. Respondents from group A feel that their teamwork contributed to better care, because they feel a valued member of the team. The team is also defined as the entire practice staff, and not just the clinicians in the practice. However, respondents also feel that if districts nurses (DNs) and health visitors (HVs) were more to be involved as part of the team, then diabetes care for nursing home and house bound patients could also be improved.

“…good teamwork, weekly meetings for the healthcare team, and monthly meetings with admin staff…”

“…GPs, PNs, DNs meet weekly to discuss everything – patients, problems with patients, reviews, changes and new plans, and iron out and co-ordinate work and skills…”

“…also have monthly practice meetings at the end of the month with the GPs, nurses (PNs), receptionists and practice manager to discuss admin things…”

“…team effort and communication – interested and educated PNs, GPs, and communication between them and the admin staff. It’s all down to staff at the end of the day…”

“…nurse (PN) autonomy… leaves a lot of things to me, so I am happy and able to get on with it, feel capable…able to negotiate and feel in control …”

“…..GPs know what we (PNs) are doing and why we are doing it, and know that we are on top on things, and we feel valued because the GPs will say, “You’re doing well, girls…”

“…involvement of DNs and HVs, especially for home bound patients”
Factors affecting Diabetes Care Delivery in Primary Care in Salford

None of the respondents from group B mentioned practice meetings or feeling valued. However, a practice manager discussed team working, and a nurse felt that having formed a relationship with the DSNs, she has better access to them.

“…teamwork...having the right people doing the right jobs…using time more efficiently”

“…now that I have met them (DSNs) on the Warwick course I feel I know them and able to check with them that I am doing things properly and ask them questions on patient management without feeling stupid…”

4.4.2. Professional-patient

Most respondents feel that this is important, and seems to affect patient attendance and compliance, as well as the way they could alter care to suit the patient. This theme emerges strongly in, although not specific to, the single-handed practices.

“…building a good relationship with patients, encouraging them to come back for follow-up…”

“…open telephone access for patients…know they can just give me a ring…”

“…very few DNAs as patients have got to know me…”

“…being a single handed practice, only having one GP, one PN, one PM means that patients get to know us very well and feel comfortable with us. Patients are good at coming in for reviews and being compliant with advice or treatment…”

“…on 1st name terms, and they feel they can tell me anything…..seems to improve compliance because they try to do the things that they think will please me

“…the only PN, so I know my diabetics…not only for diabetes care but ‘flu jabs and so on…very few DNAs”

“…knowing the patient well enough and so not miss things which may have a knock on effect on their diabetes e.g. if I realise they are ‘not looking themselves’
then I could find out if they are depressed, since that would affect their diabetes…”

5. Barriers

Although this is not a specific theme, it is one of the major questions in the interviews. Most of the issues which pose barriers have already been discussed in the previous headings of themes e.g. difficult and disinterested patients, problems with space in cramped premises, long waits for patients to access care, poor communication between healthcare professionals, etc. However, other miscellaneous problems include lack of resources whether finance, time or knowledge, and not being fully computerised so that 2 partially complete clinical information systems have to be maintained, and a respondent from group B discussed the dichotomy between patient choice and ‘hitting targets’. Two other respondents (one from each group) said that they felt there were no barriers to offering an ideal service to their diabetic patients.

“…lack of resources – primary care is reaching saturation point, cannot do anymore with what is has…”
“…lack of space, computer terminals, rooms, finances…”
“…lack of time…lots of other things to do, disease areas to manage…”
“…professional overload, lack of time, lack of knowledge, lack of motivation…”
“…not fully computerised…double entries into notes and computer…”
“…dichotomy between hitting targets and allowing patient choice…we’ll never get it right because of the dichotomy”

These results will be discussed in the following chapter, in relation to Ch 4.
Chapter Six
Discussion and reflections

Discussion

Information gathered for the quantitative study revealed that outcomes of diabetes care in Salford is unequal and greatly variable between practices. In the worst practice, no diabetic patients were treated to target, while in the best practice, 55.5% of diabetic patients were treated to target. Information from the DIS also revealed that the average GP practice had a population of 3740 patients, of which 105 have diabetes (prevalence 2.9%). The average practice reviewed 76% of its diabetic patients annually, and measured HbA1c in 78% of those patients reviewed. The average practice also achieved target HbA1c in 29% of diabetic patients who have had HbA1c measurements.

Statistical tests (Ch 4) demonstrated no correlation between care outcomes and practice population or diabetic numbers and prevalence. There appeared to be some correlation between the number of diabetic patients attending for an annual review, as well as the number (and proportion) of diabetic patients who have had measurements of HbA1c, and care outcomes. These results confirm an association between some measures of care processes and the measure of care outcomes. This is in keeping with results of the literature review in Ch 2. It would confirm that diabetic patients who attended for an annual review and had HbA1c measurements, would be more likely to have better care outcomes.

However, statistical testing of data collected from the questionnaires was unable to demonstrate any significance differences of care outcomes between practices, which did or did not provide the following structures and systems of care that had previously been shown to improve process and patient outcomes (in the literature review):
Factors affecting Diabetes Care Delivery in Primary Care in Salford

- a specific diabetes clinic
- computerised clinical information systems
- diabetes team meetings
- regular audits & feedback

Although having a PN interested in diabetes care did not seem to affect care outcomes, having a GP interested in diabetes care did seem to improve care outcomes. This is the only statistically significant factor, affecting care delivery and outcomes, identified from this study. Practices which carried out more frequent diabetes reviews also seemed to have better care outcomes, but this effect was just short of statistical significance.

Confounding factors

These results are unexpected and do not confirm those of the literature review. The structures of care provision that have been shown to improve care processes and care outcomes in literature, do not seem to have the same effect in the Salford GP practices studied. However, it must be remembered that certain structures or programmes of care delivery have already been implemented in Salford (see Ch 1), so that Salford practices will already have these in place. Hence, associations between the following factors and care outcomes cannot be studied:

- regular recall and review
- use of protocols or guidelines for diabetes care
- patient information and education
- professional education

Another confounding factor is caused by the fact that the care outcome measure for this study is derived from data in the DIS. The DIS records information for all diabetic patients in Salford whether they attend for care at GP practices or at Hope Hospital. So, patient outcomes for any particular GP practice reflect not only the quality of diabetes care at that GP practice, but also at Hope Hospital. A GP
practice delivering poor diabetes care would be able to have good care outcomes, if the majority of its diabetic patients were well looked after by Hope Hospital. If the data from the DIS could be segregated so that patient data from GP care alone could be available, and this data combined with results of the questionnaire, the statistical tests may be able to demonstrate differences in care outcomes between different practices with different structures of care. The DIS data is also incomplete, as not all GP practices submit their data sets and not all diabetic patients attend for care.

Other confounding factors are the structures and systems of care themselves. As discussed in Ch 2, the interventions and programmes of care in different studies and indeed different practices are neither “standardised” nor “quality assured”. If audit & feedback is followed by different plans for change, then two different surgeries regularly performing audit & feedback may have different outcomes of diabetes care if their processes for improvement differ. Adherence to these interventions may also be variable so that, even if present, not always delivered similarly within the same practice. This makes it difficult to assess the significance of care provision on care outcomes.

Another reason for the apparent lack of real association between factors of care and care outcomes could be the presence of other factors or issues that influence these infrastructures and processes of care, but have not yet been identified e.g. how audit & feedback is done, or how often audit & feedback is done, or what aspect of diabetes care is audited, or what has been done with the feedback from the audit etc.

An obvious limitation of the quantitative study is its size, only involving 44 practices. Statistical analysis and patterns of observation might be improved with a larger sample size. However, as Salford is a small PCT, this is inevitable, and the purpose of including a qualitative study is to provide more information than might have been available from a quantitative study alone. Nonetheless, this study was able to provide information, which I shall include in discussion of the qualitative study.
Findings from the qualitative study provided added information by revealing other issues that might affect diabetes care delivery and outcomes. Although sampling for this study was purposefully collected from practices with the best and worst care outcomes, there was commonality in the issues raised and discussed by both groups of respondents.

**Other factors affecting care delivery and outcomes**

Apart from factors already looked at in the quantitative study (Ch 4), other issues include:

- health professional attitude and motivation, knowledge and confidence, specialisation in managing diabetes
- patient responsibility and treatment compliance, interest, empowerment and self-management in their disease
- premises, computerisation and diabetes clinics
- systems e.g. administrative, management, clinical and information
- communication, relationship and team-working
- access to specialist care

Issues regarding the quality of premises and development of computer use were raised by practices, which felt that poorly developed premises or computerised systems were barriers to providing good care. However, practices with well-developed premises, or computerised systems did not discuss these as factors contributing to good care. Diabetes clinics were discussed, but again without affirmation of its necessity for good care.

Practices that ran them were happy with the arrangements, and practices that didn’t run them were also happy with their arrangements. It would appear that allocation of protected time (see Ch 2 – Greenhalgh, 1994) for care of diabetics was the significant factor, rather than whether this protected time was within the
Factors affecting Diabetes Care Delivery in Primary Care in Salford

umbrella of a specific clinic (Pringle 1993), or within the setting of usual surgery consultation.

Discussion of the health professional’s attitude was common and viewed as important. Most respondents felt that interest in the disease was important. The quantitative study suggested that GP interest was significant while PN interest was not. This might be explained by the difference in the nature of care provided these different professions. The nurses’ role in disease management tended to be more task orientated e.g. measuring blood pressure, checking urine and taking blood tests, while the GP’s role is inclined towards decision making with regard to treatment management. Mechanical tasks are more easily reminded by a checklist or protocol, while decision making is less so. Also, studies looked at in the literature review would support the fact the nurses are better at following protocols or guidelines (Davidson 2003 and Denver 2003) than physicians (Grant et al 2003 and Meigs et al 2003). Given that the GP’s task is more unstructured and the GPs are less likely to follow protocols, then the issues of interest, attitude and motivation may be significant factors in care delivery.

Health professional education, knowledge and confidence were thought to contribute to good care. This is in keeping with the findings of the literature review. One respondent mentioned specialisation, which seemed a natural progression. This would appear to contradict the wisdom of shifting diabetes care from specialist secondary care to generalist primary care. Indeed, since this shift of care was promoted for financial reasons, it is not surprising that primary care struggles to equal secondary care in the quality of diabetes care provided. Although studies have shown that primary care can equal secondary care in the quality of diabetes care provided (see Ch 2), it does not follow that every GP practice is able to do this. This is evident by the findings of unequal and inadequate care in the community (Beckles 1998). Perhaps this inequality and inadequacy is partly explained by the issues of health professional education, knowledge and confidence. Perhaps, the retrograde step of restoring diabetes care to specialists, albeit GPSIs, is the way forward.
Patient factors discussed (see bullet points above and in Ch 4) are unanimous and heartfelt. This confirms findings from the 6 qualitative studies examined in the literature review. Although the healthcare profession is able to offer information and education about the disease, it is not able to “legislate patients’ attitude”, nor “force patient empowerment” nor “offer quality services to disinterested people”. Nonetheless, in Salford, educational programmes for patients are already in place and plans to develop the ‘expert patient’ through ‘empowerment’ are being piloted (see Ch 1). However, the issues raised are ubiquitous and will remain a factor in unequal care outcomes.

Access to specialist care seems to be a problem. Part of this problem arose when diabetes care was shifted from specialist care to primary care. The reason for the shift is financial, and this reason partly explains the problem of access. Greenhalgh (1994) has suggested that well-developed liaison teams should support this shift of care. This would alleviate the problem of a generalist doing a specialist job. However, not having these liaison teams is another reason for access problem. It follows poorly developed services or facilities e.g. phlebotomy or dietetics, would create a problem with access, simply because they are not there to be accessed. Some respondents have mentioned communication with specialist teams as the key to improved access. The problem of access needs further study so that solutions may be found. This problem is likely one of systems (see below), so that its development falls within the mandate of the PCTs.

As mentioned above, communication between healthcare professionals is an important factor in care delivery and outcomes. This problem is created by the way we deliver care. Due to the process of specialisation, diabetes care for a particular patient is fragmented between different healthcare professions (GPs, PNs, DNs, diabetologists, dieticians, optometrists etc). Communication is the key to the problem of fragmented healthcare provision. This is mentioned in my essay for the ICT module (INF6520). Current methods of communication, through letters can be fraught with problems e.g. not arriving, or having a lag time, which can be measured in months rather than hours. The telephone provides a more instant solution but requires synchrony, which is often difficult.
Factors affecting Diabetes Care Delivery in Primary Care in Salford

amongst busy healthcare professionals. However, the government and DoH have recognised this problem, and its solution. Indeed, a key objective of the NHS information strategy is to provide seamless healthcare, by providing ICT as a vehicle for timely and efficient sharing of clinical information (NHS Executive (1998).

Team working and relationships are more subjective issues and difficult to assess and compare. Teamwork has been mentioned, although not explored in several of the qualitative studies looked at in Ch 2 (Bower et al 2003, Khunti 1999, Stevenson et al 2001, van den Arend et al 2001). Team-working and interprofessional relationships are issues raised by respondents in group A (Ch 4) as factors which contribute to improved diabetes care. This issue would benefit from further study.

Both groups raised the issue of the professional-patient relationship. This relationship is widely researched, discussed and debated. There is evidence that patients want a ‘personal’ service, and yet also value rapid access in emergencies (Gold at al 1996, NICE 2001). Studies have found that patients most value this personal doctor-patient relationship when addressing a psychological or significant health problem (Kearley et al 2001, Schers et al 2002) but are willing to forgo it for more immediate access for minor problems. As diabetes is a chronic disease with complex needs, the current requirement of the government for all patients to be seen by a GP within 48 hours may not work for the benefit of the diabetic patient in primary care.

Systems

Finally, there are care processes discussed, which I have placed under the theme of ‘systems’. ‘Systems’ are not standardised entities. They are composed of processes which work together to achieve specific functions, and the processes comprised may vary between different systems which may achieve similar functions. So, there may be several ‘systems’ for ironing a shirt, but the end
achievement is a perfectly ironed shirt. Nonetheless, if a system did not exist for ironing the shirt, it may not be perfectly ironed if certain processes were omitted. Hence, systems are akin to checklists of tasks which work together to ensure functionality.

There are several systems for good diabetes care:

- setting up a chronic disease register
- systems of recall and review i.e. recalling patients for disease review at regular (usually annual) intervals
- structured review of patients using a checklist or template
- screening for diabetes
- audit & feedback of various aspects of diabetes care

There is difference in the way ‘systems’ are discussed between the respondents from the 2 groups. Group A respondents discuss the importance of adherence to developed systems, while group B respondents discuss the importance of having the right processes for developing these systems. Group A respondents also look for ways of developing new systems, while group B seem to be in the processes of developing basic systems in diabetes care. It may be the lack of good systems or failure of adherence to systems, which is a barrier for group B.

**Identifying the ‘missing link’**

Many of the issues identified from thematic analysis of the qualitative study have already been identified from previous research. Some problems are not unexpected e.g. finding that some GPs are unable to provide as good quality diabetes care as others either because of lack of interest or knowledge, or having problems accessing specialist care when needed. Others are difficult to research because of their subjective nature e.g. patient interest or responsibility in their own disease management, or interprofessional communication and team working, or even systems development and the processes involved.
Nonetheless, positive findings from combining methodologies for this study confirm that GP interest in diabetes, attitude and motivation may be significant factors in care delivery. Other features of structured diabetes care which have previously been shown to improve process and patient outcomes (in the literature review) may have been so well developed in the past decade that their ability to effect any further improvement has ‘plateau-ed’. Other issues not previously identified might now come into the forefront, revealing their role in achieving improved healthcare delivery.

These other issues raised which might benefit from further study or research are subjective ones e.g. patient factors, team working and interprofessional relationships, access to specialist care, and development of appropriate and effective systems for achieving good diabetes care outcomes. Could these be the ‘missing links’ between care programmes and patient outcomes? Like therapy or medication, care programmes are still only tools for health improvement. The tools themselves cannot affect health improvement, but their conscientious and appropriate application could. Although there is scientific evidence that Metformin can lower blood glucose, it cannot do so unless taken correctly by the patient.

The aim of diabetes medication, therapy and programmes of care as identified in the literature research is to improve clinical outcomes of diabetic patients. Research has demonstrated their ability to do so, yet patient outcomes are variable. This unequal and variable outcome in care is the impetus behind the emerging National Service Frameworks (NSFs). The aim of the diabetes NSF is to improve the health of patients with diabetes. It sets out the 12 mission statements, and national objectives for implementation (Ch 1). However, these mission statements would not be met if the objectives are not implemented. Implementation of these objectives may be dependent not only on developing and getting the infrastructures in place, but also carrying out the processes that enable these tools to perform their function.
Further research should centre on 2 objectives:

1. developing standardised and ‘quality assured’ interventions i.e. structures or systems of care
2. explore the reasons behind apparent failure to implement interventions which have been shown improve patient care i.e. social science of therapy

Reflections on the learning process

As a medical doctor, I was accustomed to reading research papers and journals, and gleaning scientific evidence from quantitative studies. I was more familiar with the concepts of and basis for quantitative research, so that learning about qualitative research and its methods was a new experience. It was not a methodology I felt comfortable with initially, but through speaking and sharing through a research group run by Salford PCT’s research manager, I was able to appreciate the advantages of qualitative methodology in adding to research information. Hence I was able to conduct my own research, using a combination of both methodologies.

I was keen to gather as much information in as short a time and as conveniently as possible, so that I felt that triangulation would allow me to do this. Triangulation combines methodological approaches to complement each other, to address different facets of a research issue. Also, I was aware that the numbers involved in the quantitative study are small and may not achieve statistically significant results. Small numbers could influence the findings by ‘skewing’ results, and not reflect findings of a ‘normal’ or general population. For this reason too, I felt that triangulation would produce information which would either augment or enhance findings from either methodologies.

However, it must be emphasised that I am a beginner in research and although both methodologies were used, neither was in great depth. The quantitative part of this study was done as an audit and cross sectional study, but an experimental
Factors affecting Diabetes Care Delivery in Primary Care in Salford

study (e.g. RCT) would have increased the strength of evidence. The qualitative part of the study involved interviewing subjects, but observations or process mapping of the interviewees would have added much richer information and put contents of the interviews into perspective. Unfortunately, such methods required more resources than I had available.

There were many aspects of learning from the attempt to conduct research. There was the preparation:

- identifying a topic or subject
- refining the subject of choice through literature review
- defining the question for the subject of choice
- understanding the different methodologies
- deciding on the methodologies of choice
- articulating the aim(s) and objectives of the study
- developing the methods for sampling and data collection
- submitting the anticipated study for ethical consideration
- piloting the questionnaire(s)

Having worked my way through the above, there was the actual process of:

- sending the questionnaires and chasing up their return
- arranging for the interviews and conducting them
- recording the interviews and transcribing them
- analysis and interpretation of the results
- synthesis and presentation of the findings

As mentioned in Ch 4, I had problems arranging focus group interviews, so most of the interviews conducted were on a one-to-one basis. This may have influenced the information gathered. There were also problems with gaining access to the DIS (Ch 1) and the data held there. It was considered by the GPs and Salford Royal Hospital Trust to be confidential information, and owned by the individual GPs. However, with the new powers of the PCTs, Salford PCT felt
Factors affecting Diabetes Care Delivery in Primary Care in Salford

it had a right to that data which stratified the quality of care provided by GPs, in relation to diabetes care.

Unfortunately, it was not within my authority to gain access to that information and I had to leave it to my line manager to get me the information. Although the information was eventually provided, it was incomplete and did not identify the main provider of diabetes care (either GP or Hospital) as mentioned earlier. Furthermore, I had no way of verifying its accuracy.

Also as discussed earlier, findings from the quantitative study could be flawed because of various confounding factors and limitations. Findings from the qualitative study could also be flawed because of the subjective nature of the method. Could the methodology tools and samples have been poorly chosen or developed? Could the processes involved been subjected to bias e.g. in the way facial expressions and vocal intonations are used in the interviews? Could the respondents be implying more than what they were articulating? Is my interview technique adequate for extracting as much information as possible? Am I accurately interpreting and identifying all the issues that have been conveyed to me through the interviews? The validity of such a method was open to question as I was not an experienced researcher and so I could not be sure that my findings were a true reflection of the situation as it stands.

However, as I had the support of both my trust (Salford PCT) mentor and research advisers, I was able to benefit from:

- regular discussion sessions
- close scrutiny of the methodologies and questionnaires used
- analysis of the data collected
- developing interview techniques to expand on answers given
- separate independent identification of emergent themes from the interview transcripts.
I also had problems with statistical analysis, and interpretation of data from the quantitative study. My knowledge of statistics belonged to a distant past, and was not adequately proficient to apply for analysis of the data I had collected. However, lectures and materials from the ‘day schools’ in this final year (of the MSc. programme) were helpful. I also had help from the medical statistic department of the ScHARR unit (at Sheffield University) with regard to manipulating, analysing and interpreting the data I had.

I had originally planned to use action research for this study. In addition to the objectives (1-5) stated in Ch 3, the following would have been added:

1. To develop and test appropriate service models for structured long term care of patients with diabetes
2. To evaluate the effectiveness of the initiatives developed
3. To confirm initial findings of the study as outlined in objectives 1-5 (Ch 3)

By using research, the gap between ideal and current situations could be identified, and plans made to narrow that gap. An intervention phase is required for the development and testing of service models for successful chronic disease management. Initial findings could be tested through changes implemented, then evaluation of these changes might confirm the findings, and inform future plans and changes. I had made a work plan and timetable (below) to include a period of intervention and evaluation.
Work Plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionnaire and interview schedule development</td>
<td>Sept – Oct 2002</td>
</tr>
<tr>
<td>Sampling</td>
<td>Oct – Nov 2002</td>
</tr>
<tr>
<td>Data collection</td>
<td>Nov 2002 – April 2003</td>
</tr>
<tr>
<td>Data analysis</td>
<td>April – May 2003</td>
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<tr>
<td>Plan and implement changes</td>
<td>May – Oct 2003</td>
</tr>
<tr>
<td>Evaluation of changes (further data collection and analysis)</td>
<td>Oct – Dec 2003</td>
</tr>
<tr>
<td>Writing up</td>
<td>Jan – Mar 2004</td>
</tr>
</tbody>
</table>

This work plan was made to run with my previous job contract, which ended in Jan 2004, after which I would no longer have access to Salford PCT information.

As stated earlier (Ch 3) the purpose of this study is to provide information but not necessarily solutions. The purpose of research is to provide information, but for the research to be of use, the information must be useful. In healthcare, information is useful if it leads to improved quality of healthcare and ultimately improved patient health outcomes (discussed in a previous essay on information needs, module HAR6001). The aim of this study is to provide information that could be useful for improving healthcare services, and hence health outcomes, of patients with diabetes. This is reflected in the objectives (defined in Ch 3), to assess the current care provision and care outcomes, then finding associations between them. This information could be used to develop models of care and implementing change.

In carrying out this study, I felt that I had learnt about research, and also gained information from the research I had conducted. However, as I am uncertain of the quality of this information, I felt that further testing through action research could both confirm my findings and also reap benefits in diabetes care outcomes.
Unfortunately, I was unable to carry out the full action research cycle. Because of my particular interest in health informatics, I had originally hoped to develop IT based systems solutions, which I could test and evaluate. The reason for this failure to proceed was not because of time constraints or even difficulty in developing an effective IT based system for piloting or evaluating. The difficulty was in persuading the ‘decision-makers’ that the IT based systems ‘solution’ would be cost beneficial. However, this will be discussed in the following chapter.
Chapter Seven
Recommendations

Recommendations for future research

The last chapter discussed the findings of this study, and explored possible explanations for them. It raised the question of the subjective issues of social sciences being the ‘missing link(s)’ between care programmes and patient outcomes. Results of the literature review (Ch 2) had revealed that adherence to care guidelines and implementation of action plans improved patient outcomes. Recommendations for future research and testing of these findings would include:

1. developing standardised and ‘quality assured’ interventions i.e. structures or systems of care
2. implementing these interventions in GP practices
3. evaluating process and patient outcomes in the various practices
4. explore the reasons behind any failure to implement interventions
5. explore the reasons behind any failure to achieve the expected improvements if interventions have been implemented

Although qualitative research was useful in identifying probable issues in diabetes care delivery and outcomes, the testing of these issues is best done with quantitative research, focussing on studying specific interventions (steps 1-3). But used in combination, each method would test and explore the findings of the other (e.g. steps 4 & 5 using qualitative research to test and explore steps 1-3). The above steps also describe an action research cycle, which could be perpetuating. The information gained would contribute to the research pool, as well as generate ideas and plans for continued healthcare improvements (Chalmers 2000).
Proposed interventions

1. Restoring diabetes care to specialists. It must be remembered that the reason for shifting diabetes care from the specialist to the generalist was not to improve care but to cut costs. It seems surprising then that the government should then be concerned that the quality of care delivered by generalists is worse than that delivered by specialists, and unequal amongst generalists. Although it is illogical (from the financial perspective) to restore diabetes care back to the hospital specialist, it is possible to transfer this care to ‘cheaper’ community based specialists e.g. GPSIs or specialist nurses.

2. Programmes to promote patients’ interest and responsibility in their own disease management. This is being attempted in the ‘expert patient programme’, and it could successfully increase the patient’s profile in managing his/her own disease.

3. Improving access to specialist care. This issue shares the same roots as the first. Financial constraints limit the number of, and hence access to, specialists. However, it is possible that improved communication between generalists and specialists could partly alleviate this problem.

4. Improving communication and promoting sharing of clinical information between healthcare professionals. The development of ICT is viewed as the means of achieving this. This is discussed in my essay for that module (INF6520)

5. Team building and team working. This is a social issue on which I am not well informed. I have not found much published healthcare literature on this topic, but it could be a significant factor in the management of chronic diseases.

6. Fostering the personal doctor-patient relationship. This is another social issue. Although shown to be important in the management of chronic diseases, the
government is not seeking to promote this in its plans for modernisation. It falls to the GP to look for ways to preserve this relationship.

7. Developing new and effective systems for healthcare improvement. This factor is explored widely in research on healthcare improvements. Consequently, I am most informed on this issue compared to those above. As a result of my interest in health informatics (Ch 1), I feel that information technology (IT) has a pivotal role in future development of healthcare systems.

**Recommendations for future development of healthcare systems**

In the past century, clinical leaders have restructured hospital organisation, established scientific research, formalised clinical education, set high standards of performance among physicians and nurses, and developed systems which have improved healthcare delivery and extended life expectancy (James 2001). However, for continual improvement, there is a need for systematic plans to overcome barriers, and a positive attitude to quality improvement. Barriers have been identified in this study and these are universal: lack of resources, space, time, knowledge, motivation, and professional overload. The Audit Commission (2000) found diabetes services struggling to cope with the level of demand (Ch 1).

If medicine is to make major gains in quality, then information technology must play a key part (Institute of Medicine 2001). Owing to the increasing complexity of modern medical care, the management and co-ordination of all relevant medical information requires a mastery which can only be achieved through increasing use of information technology by:

- structuring actions
- assisting with decisions
- catching and correcting errors
Factors affecting Diabetes Care Delivery in Primary Care in Salford

- providing feedback on performance
- improving communication

As mentioned in a previous essay (INF6520), IT has been successfully applied to reduce repetitive administrative workload (Audit Comm 1995). However, its development in healthcare can lead to its use as a decision-making tool, supporting clinical management of patients (Lovell & Celler 1999). It has been envisioned that the way to improve the delivery of medical care at the level of the individual patient, is the development of physician-friendly interactive clinical decision-support systems (Delaney et al 1999).

Developments in IT systems have been rapid, and their implementation and use in Salford are progressing in line with NHSIA programmes. However, many of these plans involved development of disease datasets for audits. Although the PCT may cite workforce planning among its reasons for data collection, some physicians in primary care might view this with suspicion. Despite the logic the “systems must be …primarily designed to improve the delivery of patient care, rather than support finance and administration.” (Audit Comm 1995), resources seem to be diverted from patient care to administrative information systems (Wyatt 1995), and appears to be wasted (Warden 1993). In order for primary care physicians to feel that IT is working for them, it is vital to develop IT systems to fulfil the primary aim of improving patient care.

**Development of interactive IT tools to support healthcare delivery**

The issue of IT was not widely discussed in the interviews (Ch 5) and it could be due to the reasons cited above: current use and development of IT for merely data collection and administrative tasks, and failure of its development for use in patient care as part of a systems solution. For systems to be successful, cohesive processes are important, as are tools. IT systems, like care guidelines, are tools which can make a difference to care outcomes. However, this is dependent on its relevance to the task, its conscientious application, and the quality of the tool.
Factors affecting Diabetes Care Delivery in Primary Care in Salford

Software developers could work to increase the functionality of IT in clinical decision making. There should be consultation between IT and healthcare specialists for development of IT tools relevant for the end-user.

A new generation of support tools for clinical decision making, which “make it easy to do right”, can provide reminders and prompts, integrate clinical data to help the healthcare professional manage increasingly complex practices (Dexter 2001). It is in line with government interests, as well as those of the patient and hence the healthcare professional, that these tools are further developed to meet the needs of the healthcare professional in such a manner as to:

- promote evidence based practice
- standardise and reduce inappropriate variations in clinical practice
- rationalise use of investigations and treatments
- improve outcomes of care
- support clinical governance (including safety and risk management)
- deliver the NSFs
- collect data/information as a by-product of the above care processes
- be cost efficient

In the UK, development of these tools has been slow and these clinical decision support systems (DSS) have not been well received in pilots (Eccles et al 2002, Montgomery et al 2000). There appears to be flaws in their design, so that they do not meet user needs. Nonetheless, their evaluation is useful in providing information for future developments. If a DSS is to improve performance substantially, it needs to be both useful and used. Criteria in its design include:

- easy to use
- used in relatively complex clinical situations (DM management)
- used by relatively inexperienced clinicians (non specialists)
- integrate information (knowledge base and individual patient information)
- integrated into the clinical workflow, presenting the right information in the right format, at the right time without extra effort for the user
• automated e.g. prompts
• flexible e.g. options

It must be recognised that the DSS may not improve the performance of clinicians who are already delivering specialist or ideal care, but in improving the standards of relatively inexperienced clinicians, can introduce some measure of equality in healthcare outcomes, by standardising clinical practice.

I had hoped to develop and test an IT based system which could be a solution to some of the issues raised by this study i.e. communication between healthcare professionals, access to specialist care and processes of care contributing to development of ‘systems’ of care. This system could also address some of the barriers to care improvement e.g. lack of professional time, knowledge and motivation. In addition, its use would also allow information to be collected and audited. Clinician behaviour could be observed and studied, with relevance to the way they use or adhere to care guidelines. Such a system will not only be serving a clinical function, but also research and healthcare planning.

In the event, such a system is already in development and its initial demonstration has impressed some of the decision makers at Salford PCT. Apart from all the desired features and achievements described above, it was flexible and had enormous potential:

• accessed by a web browser (enabling access from either primary or specialist care, thereby easing the problem of clinical communication or access to clinical care information)
• builds clinical protocol, or referral, or any other pathways (suited for all protocol driven pathways)
• customised to any level (from individual to organisational)
• apparently making decisions, giving options and prompts, based on rationale (dependent on the knowledge base fed in as reference) and triggered by data entered or keyed in.
• generates data as part of care management and able to produce personalised patient management or care plan (enabling hand-held patient records)

Eventually, all disease areas could be covered as long as they are protocol driven. By the same principle, systems for protocol driven non-clinical areas could also be developed to meet the interest and niche for the systems approach in delivering quality healthcare. Its purpose is to provide the infrastructure that allows management and production of relevant, timely and accurate information to support the healthcare organisation. Its objectives include providing relevant information and services to healthcare professional, patients, the public, and managers and planners.

Unfortunately, as with all ‘ground breaking’ developments, initial costs are high. Healthcare professionals and managers are also cautious in their trust of new and expensive IT software. Such a move to incorporate DSS into GPs’ working life will have to wait for government initiatives and financial support.
Chapter Eight
Conclusions

The study presented has provided information about the current practices in diabetes care delivery in primary care in Salford. By using a mixture of methodologies and methods, it is able to explore the factors which could affect diabetes care delivery and outcomes.

However, gathering information is only the first step towards providing evidence for healthcare improvements, and improved patient outcomes. In order to translate research into action, information needs to be synthesised and generated into interventions and solutions. Interventions need to be evaluated and evidence of its usefulness documented (Warburton and Black 2002). Evidence based interventions need to be implemented before healthcare improvements can be observed.

This study has highlighted the role of social issues in healthcare delivery and outcomes. While more research is necessary into these social issues, systems thinking could provide a platform for possible solutions to be built upon. IT tools such as interactive clinical decision support systems are in development, and the evaluation of such interventions could provide the feedback for lessons to be learnt and future developments to be improved.

This study was intended to proceed into development and testing of interventions in an action research cycle. Evaluation of this testing would have provided more information to promote evidence based decision-making (Davies 1991). Although this has not happened, nonetheless the framework for future study is in place, and one can only anticipate the benefits of completing the action research cycle.
If Salford Primary Care Trust is to be committed to the goals of being patient centred, delivering equitable and quality patient care, as well as the development of IT to deliver it, then such a system would bring it one step closer to fulfilling these goals.
References


Chalmers I (2000) ed. It’s official: evaluative research must become part of routine care in the NHS. *JRS* 93: 555-6


Dexter PR et al (2001) A computerised reminder system to increase the use of preventative care for hospitalised patients. *NEJM* 345: 965-70


James BC (2001) Making it easy to do right. NEJM 345: 991-3


Factors affecting Diabetes Care Delivery in Primary Care in Salford


Appendix 1

Abbreviations
ACP: American College of Physicians
BNI: British Nursing Index
BP: Blood Pressure
CINAHL: Cumulative Index of Nursing and Allied Health Literature
CASP: Critical Appraisal Skills Programme
CCT: Clinical Controlled Trial
CRD: Centre for Reviews and Dissemination
DEMS: Diabetes Electronic Management System
DIS: Diabetes Information System
DN: District Nurse
DNA: Did Not Attend
DSN: Diabetes Specialist Nurse
EBM: Evidence Based Medicine
GP: General Practitioner
GPSI: GP with a Special Interest
HbA1c: Glycosulated Haemoglobin
HV: Health Visitor
LDSAG: Local Diabetes Services Advisory Group
MeSH: Medical Subject Heading
NSF: National Service Framework
PCP: Primary Care Physician
PCT: Primary Care Trust
PM: Practice Manager
PN: Practice Nurse
RCN: Royal College of Nursing
RCT: Randomised Controlled Trial
Appendix 2

Data extraction form

Author
Year
Title
Source
Study characteristics:
Design
Quality
Size
Population
Clinical condition
Setting
Location
Intervention
Follow up
Outcomes
Statistical analysis
Appendix 3

Diabetes Care Survey Questionnaire

1. Practice name ________________________________
2. Practice population ________________________________
3. No of diabetes patients in the practice ________________
4. Do you have structured diabetes care? Yes
   No
5. Do you have a diabetes clinic? Yes
   No
6. If so, how often are the reviews? ________________
7. How long are the appointment times? ________________
8. Do you have a GP with interest in diabetes care? Yes
   No
9. Do you have a nurse with interest in diabetes care? Yes
   No
10. Do you have diabetes team meetings? Yes
    No
11. If so, how often are they held? ________________
12. Do you have a diabetes register? Yes
    No
13. Is it computerised? Yes
    No
14. Do you carry out diabetes audits? Yes
    No
15. If so, how often? ________________
16. Do you ensure that patients get a diabetes annual review? Yes
    No
17. If so, how do you ensure this? ________________
<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
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</thead>
<tbody>
<tr>
<td>18. Do you have diabetes care plans?</td>
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<td>19. If so, are they documented?</td>
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<tr>
<td>20. Does your diabetes team receive regular updates?</td>
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<td>21. If so, who provides the training?</td>
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<td>22. Do you follow specific guidelines for diabetes care?</td>
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<td>23. If so, which guidelines do you use?</td>
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<tr>
<td>24. Do you provide patient information at diagnosis</td>
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<td></td>
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<tr>
<td>25. If so, which material do you use?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. Do diabetic patients receive regular updated information?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If ‘other’, please specify __________________________________________

Dr Karen Lim
Appendix 4

Diabetes Care Interview Schedule

1. What processes contribute to your care of diabetic patients?

2. What processes do you feel work best in the care of diabetic patients?

3. What processes you feel are least effective in the care of diabetic patients?

4. What processes would you like to change to improve your care of diabetic patients?

5. What do you feel are barriers to offering an ideal service to your diabetic patients?
Appendix 5

Information sheet
Developing strategies to improve the care of people with Diabetes in primary care, in Salford PCT

Introduction
The Government’s NSF for diabetes has been developed, is being released in 2 parts: standards out in Dec 2001, and delivery strategy due out in summer 2002, and is to be implemented from 2003. The goals are prevention of diabetes, and its complications. In order to achieve these goals, diabetes services have to be patient-centred, equitable, integrated, developed in partnership, and outcome orientated.

I would like to invite you to take part in an action research study which aims to identify ways of improving processes and outcomes of care for diabetes patients in primary care. This study is part of Salford PCT’s work to re-design diabetes services. I have been employed by Salford PCT as a salaried GP to develop and test various service models which could result in improved diabetes services, to meet standards as defined by the NSF for diabetes. Ethical approval has been sought from the Local Research Ethics Committee.

What will I have to do if I take part?
The study lasts for one year and will involve GP practices within Salford PCT. If your practice agrees to take part, the first step would be to allow me to do or have an audit of your records, for patients with diabetes type 2. In addition, 3 members of the surgery (a general practitioner, a practice nurse and a practice manager) would be interviewed about their views on the care of people with diabetes, and the locally available services.

Following this, I would present the results of the interview and audit to the PCT, with recommendations for changes to improve the delivery of services. Then, I would work with your practice team and any resources the PCT chooses to
allocate, to make small practical changes to the way you care for diabetes patients. These changes will be evaluated to develop workable service models, which could then be used district wide.

At the end of the year, the audit would be repeated to try and identify if outcomes or standards of care have improved. You will be asked for your feedback on the project and whether you feel it has been helpful.

The results of this research will be fed back to the PCT to be used for re-designing diabetes services. The results will be anonymous and the study complies with data protection standards.

**Do I have to take part?**
No. Taking part is voluntary. If you prefer not to take part, you do not have to give a reason.
If you take part but later change your mind, you can withdraw even then.

**What do I do now?**
I will contact you in a few days to see if you are interested in taking part in this study. Please contact me at the address below if you have any questions. Thank you for your interest.