

DEVELOPMENT AND APPLICATION OF DIABETES CARE (TYPE 2) INDICATORS AT PRIMARY LEVEL IN THE CAPE TOWN METROPOLE REGION

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Masters of Public Health (MPH)-General track
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Date: 22 November 2006

DEDICATION

To my Lord Almighty in heaven, the only immortal God, Who alone is head over all things, for granting me wisdom, creativity and verve through and through; Blessed be He.

Special dedications go to my late father, Andrew Z. Mutsago, who, despite his tireless efforts over the decades to support my education and enable my success, did not manage to live long enough to witness this consummation of his efforts. I am strongly indebted to you, dad.

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ACRONYMS

SEMDSA	Society for Endocrinology, Metabolism and Diabetes of South Africa
WHO	World Health Organisation
CHC	Community Health Center
NCDs	Non-communicable diseases
CME	Continued Medical Education
Metro	Metropole
DHS	District Health System
MRC	Medical Research Council
PHC	Primary Health Care
BMI	Body Mass Index
MDHS	Metro District Health Service
CHSO	Community Health Services Organisation
BP	Blood Pressure
CDL	Chronic Diseases of Lifestyle
ADA	American Diabetes Association
EFTA	European Free Trade Association
ECG	Electrocardiography
SAHR	South African Health Review

ABSTRACT

Introduction

The burden of diabetes is rising in South Africa, thereby imposing a strain on all levels of the healthcare system, including the primary level. Evidence from previous studies in the Western Cape province showed that quality of care for diabetics was sub-optimal. Since many of the diabetic complications can be prevented by good management, healthcare delivery ought to be of the highest quality possible. Therefore, continuous assessment and improvement of quality of care is important in order to give people with diabetes the care they deserve.

Objectives

The study aimed to develop and apply a multi-faceted, indicator-based, audit tool to evaluate the structural, process and outcome dimensions of quality of care for Type 2 diabetes at primary level in Cape Town metropole region.

Design

The study was an audit employing a rapid appraisal approach that combined both qualitative and quantitative components.

Methods

Following development of an audit tool based on key informant interviews and literature review, data was collected on a sample of nine CHCs, using review of

patient folders, staff interviews, and observation of clinical activities by the researcher. Data was captured on the audit tool, and analysed using qualitative and quantitative methods.

Findings

The study identified numerous deficiencies in care delivery at primary care level in Cape Town metropole region. Information systems are inharmonious across facilities, and the official guideline for diabetes care is infrequently consulted. Client support structures like diabetes clubs and therapeutic groups are not widely implemented and staff have different understandings of these structures. Drug supply is inconsistent at many of facilities, and most equipment is available but is not optimally used and not calibrated. Annual investigations like fundoscopy and comprehensive foot exams are not done in the majority of patients. Patient outcome is poor, with a large proportion of assessed patients being found to have uncontrolled blood pressure and blood glucose. These findings are in agreement with previous studies on diabetes in the Western Cape.

Conclusion

Quality of care for Type 2 diabetes is poor in Cape Town metropole. Responsible health authorities need to devise and/ or improve interventions for healthcare deficiencies highlighted by the study. This will reduce morbidity, alleviate suffering, and prevent premature mortality due to diabetes. Quality of care assessment should be done at facilities from time to time in order to maintain acceptable health delivery to diabetes clients. The tool is comprehensive and useful for continuous assessment of diabetic care in primary facilities, and should be considered for roll-out to other provinces in South Africa.

DEFINITION OF TERMS

“The researcher/auditor”	the candidate
“The audit”	refers to the main study where the formulated audit tool was applied in a larger sample of CHCs.
“Diabetes club”	A concept not well understood by healthcare professionals at facilities. Various known as a ‘mini clinic’, ‘diabetes day’, or ‘diabetes clinic’, or chronic care clinic, and often confused with a ‘therapeutic club’, this term refers to a form of ‘chronic club’ or ‘patient club’, which is a specially designed series of focused (out)patient visits or clinical sessions, scheduled on an appointed day of the week and coordinated by a dedicated nursing cadre of another relevant health professional, whereby diabetes patients report to the CHC to meet the physician and or nurse(s) for routine examinations or screening procedures, for medication review and for patient education.
“Therapeutic club”	A fairly new concept in the Cape metropole and currently implemented in Elsies River only, it resembles but is different from a diabetes club in its goals. It is a tool to modify patient behaviour and addresses spiritual, emotional, physical and nutritional issues.
“CHC”	also called a day hospital; it is a primary health facility offering comprehensive, non-specialised, outpatient services.

- “Contextual documents”** Clinical documents other than patient folders, eg policies, posters, information charts, inventories, etc.
- “Evaluative tool”** the audit tool
- *“Diabetic consultation”** is a documented encounter whereby a diabetic patient is seen or examined by a doctor at the CHC for diabetic problems only. Any other documented patient visits for other purposes (like trauma admission , routine collection of diabetic medication, etc) were not counted as ‘consultation’.
- * “Current treatment regime”** means the type of diabetic medication (repeat or newly prescribed) the patient is supposed to be currently taking, based on the *latest* prescription date (noted on the prescription chart) recorded within the twelve-month period beginning November 2004. This is irrespective of whether or not the patient is *actually* taking the medication.
- *“Current weight”** means the most recently recorded body weight of the respective patient (on any date within the 12-month period beginning November 2004), even though the last weight measurement date might be different from the date of audit, and thus the weight different.
- *“Not recorded (NR)”** As it appears on the evaluation tool, this terminology means that a consultation or clinical procedure was not

documented in the patient folder when it should have been, even though the procedure might have been performed. In the absence of written evidence, the researcher assumed that the respective examination, measurement or procedure was not done.

“a visit”

A diabetic patient ‘visit’ to a CHCs is defined to be a visit for a diabetic consultation with a doctor, and not for any other purposes eg trauma or collection of diabetic medication.

“Type 2 diabetes patient”

was defined as a patient aged 30 years and over with a confirmed diagnosis of diabetes and currently taking some type of anti-diabetic medication.

*

* specific terms embodied on the audit tool itself

CHAPTER 1: INTRODUCTION

There is a rising global burden of diabetes, with the greatest increase occurring in developing rather than developed countries. It was estimated that there were about 135 million known diabetics in the world in 1995 (Kim *et al*, 2006), and this is predicted to increase to 300 million by 2020 (Zimmet, 1997, in Barnett and O’Gara, 2003). In South Africa, there are approximately 1- 1.5 million people with diabetes, with the prevalence varying by population group and rural or urban residence (Levitt, 2006, personal communication). The disease, with its many devastating complications, is a significant cause of premature morbidity and mortality in South Africa (Daniels *et al*, 2000) and elsewhere (Canadian Diabetes Association, 2003). Diabetes together with other chronic diseases, accounted for 54% of all deaths in 2001 in the Cape Town metropole (Metro District Health Service [MDHS], 2005) and was ranked tenth among specific causes of mortality in females in South Africa (Bradshaw *et al*, 2003). Annual health care costs for diabetics are estimated to be three times more than those for non-diabetic patients (Beattie *et al*, 1998).

This epidemiologic challenge comes at a time when South Africa’s health system is in transition. Although great strides have been made since 1994, the South African healthcare system still faces major challenges. The absence of a sound diabetes surveillance and record keeping system compromises the care rendered to the ever-increasing diabetic population. According to the 2003/4 South African Health Review (pp 13), “*there is need to develop a comprehensive set of chronic disease health care indicators, based on data that can realistically be collected in South Africa*”. Given this national commitment, effective healthcare monitoring and evaluation tools, and

sensitive indicators, within the context of a viable and coherent information system, are needed in the Western Cape province in order to give people with diabetes the care they deserve. The nation also faces the challenge of poorly- developed health information systems. Current information systems in the public health service sector are noted to be reactive and incoherent, and do not proactively promote care by keeping disease registers and call-recall systems. (Mash and Levitt, 2003). Yet, as Bradshaw and colleagues (2000, pp.i) assert, comprehensive, timely and precise health information is essential for formulating health policy, and for planning appropriate health services and interventions. Many published South African studies demonstrate that the quality of diabetic care in the public sector of the country is inadequate (CME, 2003). The relatively well-developed network of public sector primary care clinics in the Western Cape province provides ambulatory diabetic care to a significant proportion of the indigent population (Levitt *et al*, 1997). As part of the broader goals of the envisaged restructured health system of South Africa, the Cape Town Metro District Health Services is planning to adopt an integrated approach for selected chronic illnesses such as diabetes, hypertension, asthma, epilepsy and arthritis, and has stated as one of its key strategic goals for 2005-2006 the need to reduce the burden of diabetes and hypertension (MDHS operational plan 2005-6). Diabetes has been proposed internationally as the most suitable tracer condition to benchmark the performance of health systems (Nolte *et al*, 2006). Hence an improvement in diabetic care will have a ripple effect on other diseases as well.

CHAPTER 2:

LITERATURE REVIEW

Introduction

This chapter presents ideas from local and international literature about diabetes, its occurrence, clinical features, as well as its epidemiological and management aspects. The concept of 'quality of care', as well as methods commonly used in diabetic care evaluation is also discussed.

Definition

The American Diabetes Association defines diabetes mellitus as "a group of metabolic diseases characterized by hyperglycaemia resulting from defects in insulin secretion, insulin action, or both" (American Diabetes Association, 2000). It is a major public health problem in South Africa.

Types of diabetes

There are two main types of diabetes: Type 1 ('insulin-dependent') and Type 2 ('non-insulin dependent'). The vast majority of diabetics (90-95%) have type 2 diabetes. This type is usually diagnosed in middle-aged adults, although it is appearing in children and adolescents (Zimmet, 2003). It develops gradually and occurs due to a complex interrelationship between environmental and genetic factors. Although they do not rely on insulin for survival, 'approximately 40% of type 2 diabetics will eventually need exogenous insulin for adequate blood glucose control' (Mahan and Escott-Stump, 2004, pp. 797). Type 2 diabetics often have a clustering of risk factors for cardiovascular disease (CVD) constituting the *metabolic syndrome*—obesity (abdominal), dyslipidemia, hypertension, and atherosclerosis (Barnett and O'Gara, 2003). Hypertension is a very common co-morbidity of diabetes, and is found in up to 50% of patients with type 2 diabetes (ibid).

Type 1 diabetes on the other hand is rapid in- onset, is common in people younger than 40 years of age, and is associated with proneness to development of ketoacidosis. Insulin therapy is the mainstay of treatment for Type 1 patients. Although type 1 diabetes is less frequent than type 2, it is associated with immediate and fatal consequences if inadequately treated (SEMDSA, 1997).

Epidemiology and risk factors

Diabetes prevalence in South Africa varies from about 4-5% in the white population to as much as 15% in the Indian population (Beattie *et al*, 1998). Levitt (2006, personal communication) estimates that about 1-1.5 million people in South Africa have diabetes. Globally, around 200 million people are reported to have diabetes, and this is predicted to increase to 300 million by 2020 (Zimmet, 1997, in Barnett and O’Gara, 2003). This rapid increase in the number of diabetes cases is attributed to, among other things, the ageing population, increasing obesity, over nutrition, as well as more sedentary lifestyles (Barnett and O’Gara, 2003). Certain groups of people in South Africa are at risk of developing type 2 diabetes, namely: direct relatives of people with the disorder, people with abdominal obesity, people of Indian-Malay origin, urbanised black populations, women with previous gestational diabetes, people with impaired glucose tolerance test (IGT) and those who are physically inactive.

Complications

Due to its greater prevalence, type 2 diabetes has received relatively more attention in public health policies than type 1. Diabetes is a devastating disease because of its many disabling or fatal microvascular and macrovascular complications (Barnett and O’Gara, 2003), and considerable associated costs (Zimmet, 1997). The long-term complications include foot ulcers, lower extremity amputations, eye problems (blindness), renal

failure, stroke and coronary artery disease. Diabetic retinopathy is the most common cause of blindness in adults aged between 30 and 60 years in developed countries (Mollentze, 2003). Diabetic foot problems are the commonest reason for lower limb amputation in Western Europe and the United States, and diabetic kidney disease the single most common reason for chronic renal failure and the need for dialysis (Barnett and O'Gara, 2003). The long term complications are not only associated with high morbidity; they also result in premature mortality. 'It is estimated that 80% of people with diabetes mellitus will die as a result of a vascular event' (Canadian Diabetes Association, 2003, pp. s58). The care and management of people with diabetes costs more than twice that of people without diabetes, and, in Western European countries, diabetes care accounts for 2-7% of the total national healthcare budgets (Zimmet, 1997).

Unfortunately, many people already have complications at the time diabetes is diagnosed or when the complications are advanced. That good glycaemic control can prevent microvascular complications has been demonstrated in the Diabetes Control and Complications Trial (DCCT), a prospective study on 1441 American type 1 diabetes subjects, and the United Kingdom Prospective Diabetes Study (UKPDS) in type 2 diabetes patients. The DCCT found that, following intensive glycaemic management, there was approximately a 60% reduction in risk of diabetic retinopathy, nephropathy and neuropathy within a period of seven years (American Diabetes Association, 2000). The UKPDS demonstrated that in people newly diagnosed with Type 2 diabetes, there was a 35% reduction in risk of microvascular complications for every percentage point decrease in HbA_{1c}. This study also demonstrated that improved blood pressure (BP) control significantly reduced strokes, heart failure, microvascular complications, visual loss, and diabetes-related deaths (ADA, 2000). There is also evidence that early detection

of complications with appropriate intervention can reduce their sequelae. For example, treatment with laser therapy for certain stages of diabetic retinopathy can prevent blindness (Mollentze, 2003), and appropriate management can prevent or heal diabetic foot ulcers, thereby significantly lowering the amputation rate (Canadian Diabetes Association, 2003).

It is therefore important to improve and monitor healthcare delivery for people with diabetes in order to reduce morbidity, save many lives and avert unwarranted healthcare costs. Indeed a change in the structure of healthcare delivery would be needed if the type 2 diabetes epidemic is to be controlled (Zimmet, 1997).

Diabetes care guidelines

It is incumbent upon every effective healthcare system to ensure that the care provided to its patients is guided by evidence-based and up-to-date guidelines and standards. Although the actual use of clinical practice guidelines has been found to lag behind expectations in South Africa (Daniels *et al*, 2000), and many other countries, the development and application of appropriate practice standards and guidelines has been one way in which countries have risen up to the challenge to improve quality of care for this growing health problem (Levitt *et al*, 1997).

The importance of clinical practice guidelines cannot be overemphasized. In 1996 the Society for Endocrinology, Metabolism and Diabetes of South Africa (SEMDSA)] issued the first edition of the consensus *Guidelines for the management of type 2 diabetes at primary healthcare level in South Africa*, in order to improve management of the condition. These were revised in 2002, and another review is pending. The SEMDSA submits that “the increasing emphasis on community-based care and responsibility taken by non-medical healthcare professional [has] highlighted the need

to standardize and provide clinical practice recommendations that promote appropriate and acceptable quality diabetes care and education for all our population” (SEMDSA, 1997).

Health Systems Research (HSR) and the concept of Quality of Care (QOC)

Health systems research has gained attention internationally (Health Systems Trust, 1997). By definition, health systems research is research done on the health system and all its component parts and activities (Katzenellenbogen, 1997). Unlike basic or traditional research aimed at generating new knowledge, HSR is applied research, and is necessary for identifying priority problems and designing and evaluating policies and programs that will be of the greatest benefit, using the existing fund of knowledge and available resources (Varkevisser *et al*, 1993).

The term ‘health systems research’ is used for research done on the entire health system; but when research is applied to a component of the health system, namely health services, then the term ‘health services research’ is used.

One of the distinctives of HSR is its participatory nature: emphasis is placed on involving all necessary parties like healthcare staff, the community, and decision-makers- at all stages of the research. This is essential for gathering rich, high quality data, and for ensuring that recommendations to be implemented are acceptable, feasible and sustainable (Varkevisser *et al*, 1993).

The existing capacity to undertake HSR is still small in South Africa, which is unfortunate since HSR offers a viable means to improve quality of health care delivered to patients.

The concept of quality of care

The concept of quality of care is complex and thus variously understood. So many elements are included in the notion of quality. One school of thought, put forward by Donabedian (1988), posits that 'quality' of health care is a multidimensional entity that incorporates aspects of:

- *Structure* (characteristics of the healthcare setting, e.g. financial, human and physical resources)
- *Process* (the encounters and activities of both patients and practitioner, e.g. diagnoses and interpersonal interactions).
- *Outcome* (how the patient responds to care, e.g. death, disease, disability, discomfort and dissatisfaction).

In this vein, Donabedian (1988) recommends a three-part approach to quality of care assessment, asserting that '[a] good structure increases the likelihood of [a] good process, and [a] good process increases the likelihood of [a] good outcome' (pp.1745).

Healthcare practices, and hence quality of care, are influenced by multiple factors. Although there have been few studies involving assessment of patient factors, studies conducted in the Western Cape have demonstrated defects in elements of structure and care processes, for example low staff knowledge and apathy towards care guidelines, budget constraints, high patient loads, and organisational resistance to 'diabetes clubs'. (Daniels *et al*, 2000). In addition, an audit of five day- hospitals by Levitt and colleagues (1991) found that less than 10% of the audited patient records had a documented investigation of laboratory blood glucose and serum creatinine, foot examination, fundus examination and visual acuity test in the preceding year as per recommendations. Goodman *et al* (1997) interviewed nurses and doctors in CHCs and

found that communication between nurses and patients was thought to be a problem in addition to lack of staff knowledge of diabetes. These failures persist in spite of direction provided by SEMDSA diabetes care guidelines.

Currently there exists at the international level a great chasm between what is known to improve diabetes outcome and the routine primary care practices (Glasgow *et al*, 2005; Li, 2004).

Indicators of quality

Subject to good collection and recording of surveillance data, the burden of diabetes and the quality of diabetes-specific care can be monitored and evaluated using chosen indicators, and recommendations drawn to inform policy. Since it is not possible to collect data on every aspect of diabetes, a smaller set of relevant indicators of diabetes quality of care can be formulated and used for evaluation purposes (Chittleborough *et al*, 2003). Good indicators should possess the following characteristics. “They should be:

- Worth measuring, that is, they should represent an important, salient aspect of the public’s health.
- Measurable over time to reflect results of actions
- Feasible to collect and report
- Understood by people who need to act, and be of such a nature that action can be taken
- Relevant to policy and practice, with the potential for action that can lead to improvement when applied.”

(Chittleborough *et al*, 2003, pp.10)

Data sources for indicators

Attempts to use indicators for monitoring and evaluation can be frustrated if data sources for the indicators are absent or not easily accessible. When a European Union working group tested the feasibility of a tentative set of diabetes indicators in various EU member countries, problems of absent, inaccessible, or non-comparable data sources were encountered (Beaufort *et al*, 2003). The Western Cape is not spared by the problem of poor clinical data systems (Mash and Levitt, 2003). Good surveillance is predicated upon the availability of suitable, accurate information, that is, a sound clinical record system. Additionally, continuous evaluation of clinical data sources in health care facilities should be part of the ongoing monitoring process, and harmonisation of data sources is necessary to ensure comparability of indicators among jurisdictions (Beaufort *et al*, 2003).

Use of qualitative research methods in the health sciences field

Health research has traditionally been dominated by use of quantitative research designs. In much of the previous health research work, designs have largely been empirical, describing measurable phenomena and examining objective questions like, for example 'number of patients with diabetes complications' (Ulin, 2002).

Notwithstanding its usefulness, the quantitative approach collects data that often lacks contextual detail (ibid).

Because of the unprecedented global health crises plaguing the contemporary world, the emerging new areas of health research, as well as the increasing complexity of health (and healthcare) aspects to be explored, use of more innovative research approaches is

warranted. The qualitative approach, drawn from the behavioural and social sciences, provides an opportunity to furnish greater levels of understanding of complex health phenomena (Ulin, 2002 and Katzenellenbogen, 2002). Often a blend of qualitative and quantitative methods can be useful, as Ulin (2002, pp v) gather: “the value of combining qualitative and structured [quantitative] survey methods in a single design and allowing each to inform and reinforce the other cannot be sufficiently stressed”. This combination has been used in a number of South African studies, for example those by Beattie and colleagues (1998) and Daniels and others (2002).

The qualitative methodology allows the researcher to understand how research participants perceive their situation and their role within that context. It uses interpretive and other open-ended methods, it is emergent rather than prestructured, and asks how and under what circumstances things occur (Ulin, 2002). Qualitative data is usually analysed by identifying recurrent themes and categorizing or coding responses. As far as sampling is concerned, “the usual epidemiological practice of formal random sampling with concern for adequate sample size is inappropriate in qualitative studies. The depth of the data gathered is the primary goal, rather than statistical inference” (Katzenellenbogen, 1997). In health systems research, qualitative techniques are suitable for studies in which recommendations for implementing research findings are drafted (Varkevisser *et al*, 1993).

RESEARCH PROBLEM AND STUDY AIMS AND OBJECTIVES

Research problem

- Diabetes mellitus is a major public health problem in the country. It is estimated that approximately 1.5 million South Africans had diabetes mellitus during the last decade (Haque *et al*, 2005). Projected statistics demonstrate an increase in the prevalence of the disease in South Africa, especially with the urbanisation of the 'African' population (www.mrc.ac.za). Diabetes imposes a major clinical and economic burden on the healthcare system. Despite this, studies have demonstrated that most of the complications of diabetes can be prevented, delayed or reduced by good management. (Levitt and Bradshaw, 2006; Beufort *et al*, 2003).
- With such a growing health problem at hand, it is imperative that appropriate and effective diabetes programs and services be put in place to improve diabetic care in the Cape metropole. In the interest of patient-oriented care, diabetes health services ought to be of the highest quality possible.
- Yet a large body of evidence suggests that quality of primary health care for diabetes is currently poor in South Africa.
- In the light of such deficiencies in diabetic care, there is therefore the need to upgrade and continuously monitor the quality of comprehensive care delivered to diabetics. The common understanding among key stakeholders in the Cape Metropole is that a comprehensive and sensitive, indicator-based evaluative tool needs to be developed, applicable at CHC level, for continuously evaluating or auditing the health care *settings* for diabetes, the care *processes* employed by staff at health facilities, as well as the health *outcome* of the diabetic patient .

Study Aims and Objectives

Aim:

- The aim of the study was to develop and apply a simple, explicit, theoretical indicator-based, audit tool for continuous assessment of the structural, process and outcome dimensions of diabetes care at primary level in the Cape Town metropole, with the ultimate view of extending the tool, to other districts, regions and provinces in South Africa.

Study objectives:

The objectives of the study were:

- To develop, using existing diabetes care guidelines, literature review and expert opinion, the relevant set of indicators to be included in the evaluative tool.
- To pre-test (pilot) the tool on three local CHCs in the Cape Town Metropole.
- Having revised the tool, to apply it to a larger, randomly selected (representative) sample of CHCs in the Metropole.
- As a result, to discover reasons for deviation by the health care system (including health professionals) from standard practice.

Implementation objectives:

- To forward the results of the research and the recommendations to the Metro District Health Services (MDHS), the Western Cape Department of Health, and other stakeholders to help inform policy.
- In consultation with primary stakeholders, to roll-out this monitoring system to other provinces in South Africa.

CHAPTER 4:

BACKGROUND TO CAPE TOWN'S HEALTH SERVICE SYSTEM

Introduction

The Cape Town metropole in the Western Cape Province is the third largest in South Africa.

Demographic and socioeconomic status

It is home to a growing, mainly urban, population of 3 061 081 people, which constitutes 64% of the provincial population (MDHS, 2005). It is a demographically young population with more females than males (Act Academia, 2001), and has a wide range of socioeconomic statuses.

Health status and burden of disease

In keeping with the entire Western Cape province, the Cape metropole is currently experiencing a triple burden of disease, namely infectious diseases (TB & AIDS), chronic diseases of lifestyle (e.g. diabetes, hypertension, asthma and mental health) and violent trauma. According to 2002 statistics, the infant mortality rate for the Western Cape province was 30 deaths per 1,000 live births (SAHR 2005).

Health facilities, services and service priorities

Cape Town has a relatively well-developed network of public sector primary care clinics that serve previously non-franchised communities. Currently there are 47 CHCs scattered within the 8 sub-districts of the Western Cape province. The public sector health system is used by three quarters of the total local population and almost all of the black population (Levitt et al, 1996). Chronic diseases like diabetes are mainly looked after in these public facilities because of the unaffordable cost of private care.

There are two health authorities delivering PHC services in the Cape Town metropole. These are the Provincial Authority (called the MDHS), and the local government authority (or Cape Town Unicity). In the interest of the new district health system, Provincial Authority and Unicity services have been integrated into “joint facilities” in some instances.

The MDHS’s 2005-2006 operational plan is contemplating integrating services and interventions for persons suffering from chronic diseases; this is a noble agenda in the wake of the current crisis in care and management of various diseases.

University of Cape Town

CHAPTER 5:

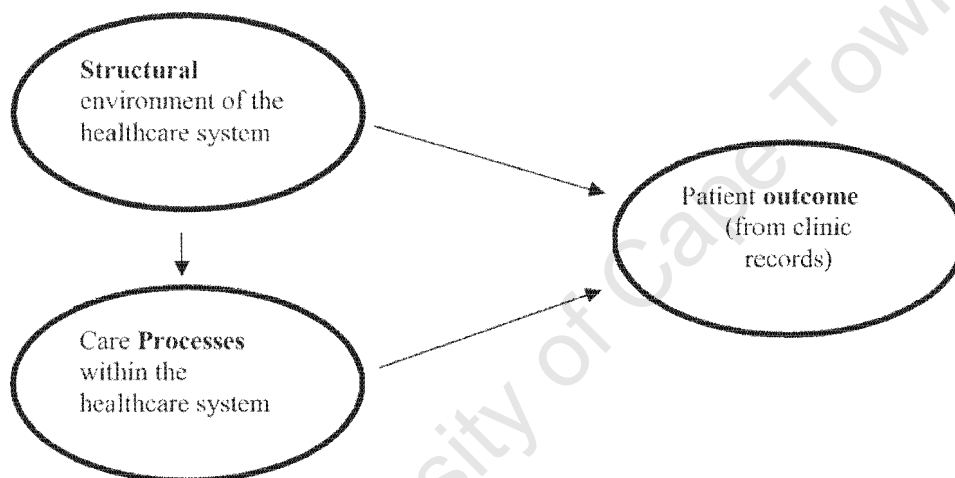
METHODOLOGY

Introduction

This study was based upon the three-part *structure-process-outcome* model of quality assessment, proposed by Avedis Donabedian (1988).

The model is represented below:

Fig 1: The three-part model for Quality of Care assessment within the healthcare system



The study was done in two phases, namely:

Phase 1: development and testing of the tool; followed by

Phase 2: Application of the tool at primary care facilities.

Study preparation

A project proposal was written and submitted for ethical approval to the University of Cape Town Health Sciences Faculty's Research Ethics Review Committee. Following approval (see approval letter in Appendix 5), permission was sought from the MDHS to undertake the study in local CHCs (Appendix 6). Key informants for the first phase of the study were identified and notified in advance. Facility managers at the pilot CHCs were notified telephonically of the plan to conduct the study in their facilities and to obtain their support. The researcher conducted a pre-study informal survey (using site visits and telephone calls) of CHCs in order to gain basic knowledge of the state of affairs in the CHCs, especially the level of availability of diabetic registers at CHCs, as well as whether 'diabetic days' were in place (and on which days they were done). Basic familiarity with the study setting was necessary for the careful planning of the

study. The researcher also underwent training on record reviewing, administered by experienced personnel from the Medical Research Council (MRC) in Cape Town. Data collection then commenced immediately, being done in accordance with the research protocol.

Study setting

Both phases were conducted in the primary care facilities (Community Health Centers-CHCs) within the Cape Town metropole region, situated in the Western Cape province of South Africa. All the CHCs located in the districts of the metropole were candidates for selection.

Phase 1: Development and piloting of the audit tool.

(a) Development of the tool

This was done using literature review and key informant interviews. Literature search on developing indicators of care for diabetes, as well as on relevant aspects of diabetes care, was done by the researcher.

I. Literature review

Before consulting with key informants, the researcher conducted a thorough search of literature (published and unpublished) on diabetes and diabetes care. The review of local and international literature sought to examine the existing diabetes care indicators applied elsewhere in the world, as well as earlier experiences in formulating monitoring and evaluation tools. The literature search additionally sought to understand the epidemiological and clinical aspects of type 2 diabetes and its management goals and details about structural health service elements requisite for optimal diabetes care (eg staff, equipment, structures and drugs availability).. Local guidelines for diabetes care, such as the *Standard Treatment Guidelines and Essential Drug List* and the SEMDSA guideline for primary-level diabetes care were examined.

II. Key informant interviews

To corroborate the literature search, semi-structured key informant interviews were administered on three *purposively* selected healthcare workers, namely

1. **One medical superintendent**, who mainly provided overall information on diabetes care aspects in the Cape metropole.
2. **One doctor**, who mainly provided information on the clinical facets of diabetic care.
3. **One facility manager**, who provided information on the structural or administrative aspects of diabetic care.

The informants were selected based on their potential or ability to supply rich, specific information on a given diabetes care aspect, and collectively the three were thought to be able to make a comprehensive and informed critique of diabetes care issues and indicators presented to them by the researcher(see Appendix 2). The interviews were all conducted in the English language as all interviewees were professionals conversant with the English language. Their comments and criticisms were used to define suitable indicators, which were framed into a three-page evaluative tool (see Appendix 8) that was then piloted.

(b) Piloting

The tool was piloted on three (3) local CHCs involved in diabetes care in the Metropole region, purposively chosen on basis of proximity to the University of Cape Town.

Twenty folders per facility were audited. Subsequent to the pilot, some amendments were made to the original tool. These are shown in Table 1 below.

Table 1: Tool Amendments

I. Structural (facility level):

- Dedicated space to capture the name of the relevant CHC and date of audit were added on the form.
- A space to capture the ‘availability (or non-availability) of folder stickers’ (and their colour) was created, as these were found to be necessary.
- On the ‘Guidelines’ section, the *PHC Package for South Africa* guideline was removed from the checklist.
- The query about availability (or non-availability) of collective register for all chronic disease patients (in contrast to a register exclusive for diabetes patients) was removed from the menu, since the study only had special focus on diabetes.
- ‘BMI chart’ was added onto the checklist of essential equipment upon the suggestion of key experts, though this implement is not in the SEMDSA guideline.
- The field to record other types and numbers of equipment available at a CHC was eliminated.
- The rating for ‘overall drug supply in past year’ was changed from **Good** or **Bad** to ‘Number of stockouts in past year’ (space for recording provided), with an additional **‘Don’t Know’** option, to quantify the level of supply and to assess whether stockouts were being documented.
- A space was created for the researcher to write miscellaneous notes since the original tool did not have ample space to capture additional free oral responses
- The overall aesthetics of the form was improved.

II. Process and Outcome (patient folder level):

- ‘Date of diagnosis with diabetes’ was deleted since this was time consuming and would be difficult to establish with accuracy (if at all) from the folder notes, because patients often forget the precise date they were diagnosed, and in the common instance where diagnosis was made elsewhere, this record is sometimes absent from the patient folder.
- A field to capture a patient’s total number of consultation visits in past 12 months was added, in order to assess the patients’ frequency of clinic visiting.
- A query for assessing whether or not the patient was on Hypertension treatment was added, in order to measure the extent of comorbidity in the diabetics.
- A space to capture the number of auscultations (apart from an ECG) performed on the patient in 12 months was added, to assess whether (and by how much) clinic staff at least attempted to assess cardiovascular wellness of the patient in the absence of an ECG.
- The query to assess whether or not BMI was done on the patient’s first visit to that CHC was removed, because it was difficult and time-consuming to sift through the patient folder to identify with certainty a first visit.
- The query about geographical place (whether at respective CHC or elsewhere) of performance of any documented lipid profile and HbA1c test was inserted since the aim was to measure what services were being provided by that particular CHC.
- A space was created for recording the actual Left and Right visual acuity readings for a patient (folder).

The amended tool can be seen in see Appendix 10.

Phase 2 (the audit): Application of the tool in a representative sample of community health centers (CHCs) in the entire metropole.

Study design:

The study design used a rapid appraisal approach that combined both qualitative and quantitative components. The components are:

- 1) *Medical audit of patient folders*: patient folders were randomly selected and each appraised to gather clinical care process and outcome information.
- 2) *Cross-sectional survey*: the audit was done within a narrowly defined time period (one month).
- 3) *Semi-structured staff corroborative interviews*: these were administered on selected staff during the audit in order to get supplementary information.
- 4) *Observation*: the researcher used this qualitative approach to supplement interviewee- provided data.

Study population:

This consisted of primary care facilities (CHCs) and folders for patients who sought diabetic care at those CHCs at least in the twelve – month period immediately proceeding November 2005.

Inclusion criteria:

- 1) CHC level:
 - located in the Cape Town metropole region
 - Having a diabetic patient load of at least 200 in the year 2005.(an MRC database was used).

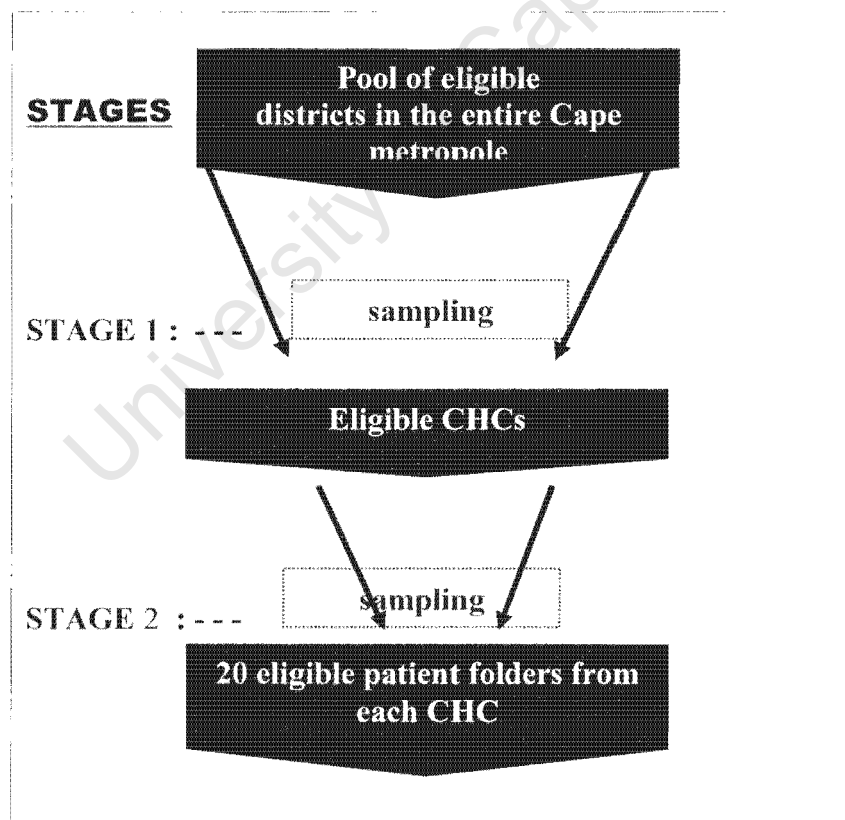
2) Patient folders:

- confirmed Type 2 diabetes diagnosis of the respective patient
- age of 30 years and above in November 2005
- having visited the CHC for a diabetic consultation at least twice in the twelve-month period immediately preceding November 2005.

Sampling:

A two-staged sampling process was used to sample the nine CHCs and twenty patient folders per CHC. This is depicted below:

Fig. 2 showing the two-staged sampling process of study units within the Metropole



Sampling method

1. CHCs:

Stratified *random* sampling was used to select nine facilities. Stratification was by district. A database of all CHCs and their diabetic populations was available from the Medical Research Council. Names of all the eligible CHCs from each district were written down, each on a separate piece of paper and picked out randomly from a hat, until all nine CHCs were picked.

2. Patient folders:

Random sampling was used to select twenty folders per CHC. However, different random sampling techniques had to be used to fit each facility situation. A different technique was used for:

1) CHCs with a diabetes register or 'attendance list' for diabetic days:

With the help of nursing staff of the relevant CHC, a patient's name was *systematically* selected from the register or the most recent attendance list, with the sampling interval being determined by the total number of patients on the register. For example, to select 20 patient names from a register with 100 names, every 5th name would be selected. The corresponding folder of a selected patient name would then be identified and audited.

2) CHCs without diabetic registers but with labelled patient folders:

With the help of nursing staff, tagged (with colour stickers) patient folders were randomly pulled out from the shelves and assessed for eligibility; the ineligible ones would be disregarded. More folders would be drawn out until twenty folders were accumulated. These were then audited.

3) *CHCs with no register and without a colour sticker- labelling system
for folders:*

The researcher scheduled the audit day to coincide with a ‘diabetes day’ at the relevant CHC, whereupon twenty folders of diabetic attendees would be accumulated while patients waited for the doctor’s consultation. Alternatively, patients’ folders accumulated by pharmacy staff as patients collected their medication were used.

3. Key informants (phase 1):

Key informants were selected non-randomly (purposively).

Data collection methods

Three data collection methods were employed for the audit, namely record review, staff interviews, and informal observation.

(1). **Record review/document analysis**

Review of individual diabetic patient folders and contextual clinical documents was done at each CHC:

1) patient folders:

A one year retrospective record review was done on each folder. The total number of patient visits to the clinic for doctors consultation was established for each visit, and information was collected on medication prescribed, weight measurements, blood sugar, blood pressure, and foot examinations. Diabetes-related outcomes, e.g. presence of foot or eye problems were assessed.

2) contextual documents:

This step assessed the structural aspects of care.

Review of various clinical documents related to diabetes care was done in order to harvest complementary information. These included documents like internal policies, activity schedules, care guidelines, patient education material, and CHC-specific monitoring and evaluation tools.

(2). Corroborative interviews (Interviews were administered in English)

These were administered at staff available staff, or staff assigned by the facility manager to respond. Depending on the situation, a semi-structured interview was additionally administered, either during completion of the data capture sheet or afterwards, to allow the researcher to clarify vague information, or to listen to explanatory comments volunteered by staff.

(c). Informal observation

The researcher did observations in order to validate interview information and documentary data. Things like staff workloads, data recording procedures, availability of various care resources, as well as the overall care environment were observation. Observation enabled the researcher to obtain a representative profile of activities and resources at CHCs.

Data analysis and reporting

Analysis of qualitative data commenced as soon as data collection began. Content analysis was done to identify key themes and to categorize the information. Microsoft Word was used to process the data and to construct tables and diagrams. Examination of the data also revealed other new issues, for example, reasons for non-implementation of certain clinical process and structures. These were also organized and reported.

Data was directly abstracted from capture sheets and notebooks, summarized, and basic descriptive statistics done. Microsoft excel was used to calculate totals, averages , ranges and percentages for the number of staff and equipment, frequency of performance of routine and annual patient examinations, numerical values for health outcomes like blood pressure and blood sugar levels, as well as the number of diabetic patients who smoke and/ or are hypertensive too.

Non-statistical analysis of potential links between structure, process and patient outcome were done, whereby patients (folders) with adverse or better outcome were identified and the associated clinical structure and antecedent care process scrutinized.

CHAPTER 6:

RESULTS

1. Study site characteristics

Table 2: Profile of surveyed health facilities (Community Health Centers- CHCs)

Site	1	2	3	4	5	6	7	8	9	
Source district ^a	CTM Central	CTM West	CTM Central	South Peninsula	Tygerberg West	CTM East	CTM South	Tygerberg East	Tygerberg South	TOTAL
Tot. diabetes population *	315	910	251	504	428	241	840	250	404	4143
No. of sampled folders	20	20	20	20	20	20	20	20	20	180

* 2003 average monthly statistics

^a CMT= Cape Town Metropole

All selected CHCs were audited using a single day as planned. Further, the target of a 20-folder review per CHC was also achieved. Three districts in which the CHCs fall and also the total diabetes population per CHC are reflected in table 2, the later varying from 241 to 910.

2. Characteristics of patients whose folders were audited

Table 3: Profile of audited diabetes patient folders

N=20	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	OVERALL
Sex : M(%)	5(25)	4 (20)	3 (15)	8 (40)	11(55)	6(30)	4(20)	7(35)	8(40)	56(31%)
F(%)	15(75)	16(80)	17(85)	12(60)	9(45)	14(70)	16(80)	13(65)	12(60)	124(69%)
Mean Age(SD)	63(11.4)	61.5(10.4)	58.9(8.5)	58.2(9.7)	59.7(7.6)	55(11.1)	64.5(9.3)	61(12.2)	54.2(8.8)	59(10.25)
Aged > 60 yrs:	12(60%)	10(50%)	9(45%)	7(35%)	12(60%)	6(30%)	13(65%)	11(55%)	5(25%)	85 (47%)
Smoking status recorded?	0	5	2	1	1	1	1	1	2	14(7.7%)
No. of smokers	0	4	1*	1	1	1	1	1	1	11(6.1%)
On HPT Rx [#]	15	14	17	15	18	12	19	20	18	145
Percent (%)	75%	70%	85%	75%	90%	60%	95%	100%	90%	81%
No. of ptnts with BMI recorded	1	3	10	2	0	0	1	10	0	27
	5%	15%	50%	10%	0%	0%	5%	50%	0%	15%

[#] Hypertension treatment

* ex- smoker

The majority of patient folders reviewed were those of women, with the exception of one site. Indeed in 3 sites $\leq 20\%$ of folders belonged to men. Forty seven percent (47%) of all the patients were aged 60 years and over, the lowest proportion (25%) being found in an informal settlement (site 9). The mean age was 59 years (standard deviation 10.3). On the other hand, hypertension as defined by use of antihypertensive pharmacotherapy (WHO criteria) was present in the majority of patients (mean 81%). In fully four clinics, the proportion of patients with coexisting hypertension was $\geq 90\%$. This is considerably higher than reported in the literature. Documentation of a patient's smoking history was infrequent ; in only 14 of the 180 folders assessed (7.7%) was the patient's smoking status documented; of these, 11 (71%) of the patients were noted to be current smokers while one (1) was an ex-smoker.

Treatment regimes

Fig. 3 below shows that, overall, the majority of surveyed patients (64%) were currently prescribed oral antidiabetic agents; few patients (3%) were on non-drug treatment (diet and exercise). Ten percent (10%) of the patients were on an insulin-only prescription, while 23% were on combination therapy of insulin and oral hypoglycemic agents. As seen in figure 4, the trend was similar for all 9 sites, but in three the proportion on oral agents was $\geq 80\%$.

Fig 3. : Overall No. of patients on different treatment

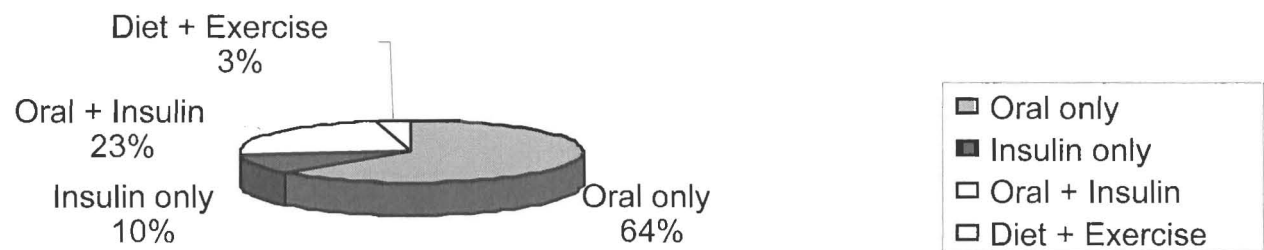
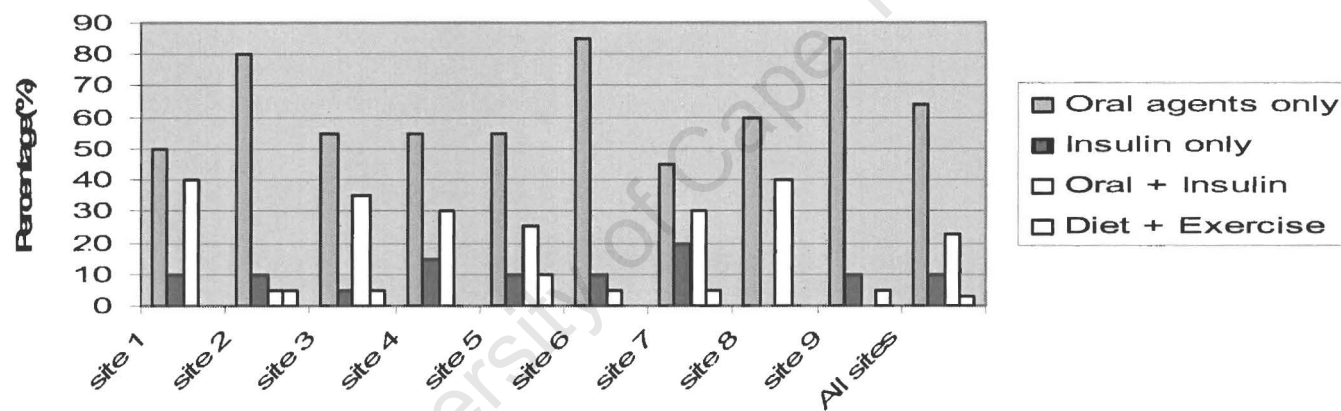


Fig 3: No. of patients on different treatment options (by CHC)



3. Quality of Care

Results for the *Structural* aspects of quality of care will be presented first, followed by those for *Process*, then *Outcome*.

3.1. Structural Aspects of quality of care

(a.) Information Systems

The types of existing information systems at CHCs were found to vary from site to site (table 4).

Table 4: Information systems available at CHCs

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Diabetes register / diary available? Form of register	☒	☒	☒ book	☒	☒	☒ --	☒	☒	☒ Book & Computer
Coloured folder sticker for diabetics Colour of sticker	☒ blue	☒ red	☒ blue	☒ --	☒ orange	☒ pink	☒ Orange	☒ yellow	☒ red
Appointment register / diary? Daily tick ('stats') sheets done	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒	☒ ☒
Other info systems	--	--	*card Index system - patient smart card	*card Index system	*MDH S Audit tool	*chronic Stamp	*Patient home diary	--	--

☒ means available ☒ means absent

Each CHC was found to be deficient in certain their record- keeping systems:

I. Diabetic register

Only 3 of the 9 CHCs (33.3%) reported having a register exclusively for diabetic patients, of which one had a register in book form, the other in both book and electronic forms. For the third CHC, the form of the register was not reported by respondent.

II. Folder sticker

All but one CHC (89% of the sites) had a colour-coded sticker system to flag diabetic patient folders, but there was no uniform colour used across the CHCs- five different colours (blue, red, orange, pink and yellow)- were used. Folders for patients with other chronic diseases (for example, hypertension, epilepsy, asthma, et cetera, also had colour codes.

III. Appointment register

Seven (7) of the 9 CHCs reported having an appointment register or diary (all non-computerized) to organize diabetic patient visits. An appointment register or diary is a rolling record of patients who are periodically booked to come to the CHC for a diabetes day, or to see the doctor, or to collect medication. It is different from a diabetes register, which is a more permanent record of all patients diagnosed with Type 2 diabetes attending that institution. Some of the CHCs that were not implement an appointment system gave some reasons for that (see Table 15).

IV. Statistics ('stats') sheets

Daily 'stats' sheets (or 'tick' sheets) were done by 7 of the 9 CHCs (78% of audited sites). These 'stats' sheets aggregate total daily patient visits according to chronic disease type (diabetes, hypertension, epilepsy, asthma and other chronic diseases)

V. Other information systems

Five CHCs reported implementing additional innovative information systems relevant to diabetic care. For example, one site reported using a patient smart card. Another CHC uses a patient home diary system (a structured paper sheet) whereby a patient takes the sheet home to self- monitor biochemical control targets like blood sugar level. A patient would need present this 'diary' to nursing staff at each clinic visit. Two sites reported using a card index system whereby patient folders are filed alphabetically according to patient's name. Only one CHC reported using the newly-introduced MDHS diabetes routine monitoring form.

(b.) Practice guidelines

Table 5: Availability and form of Practice guidelines at CHCs									
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
GUIDELINE									
SEMDSA 2002 <i>Form of guideline</i>	☒ Paper sheet	☒ Paper sheet	☒	☒	☒	☒ ---	☒	☒	☒
EDL guidelines <i>Form of guideline</i>	☒	☒	☒	☒	☒	☒	☒	☒	☒
Other	Norvo Nordisk	--	1. Norvo Nordisk 2. Foot Guides 3. ^a 4. ^b 5. ^c	--	Medical journals	Dr.'s experience	·chronic Stamp ·patient Management Sheet(diabetes)	--	--

☒ means available ☒ means absent

^a National Programme for control and management of diabetes (type 2) at primary level (25 pages)

^b Diabetes routine monitoring form (MDHS)

^c Diabetes eye screening form

All CHCs had the *Standard treatment guidelines and essential drugs list* (EDL) book. In contrast, only 3 CHCs had the latest official *SEMDSA Guideline for Diagnosis and Management of type 2 Diabetes Mellitus for Primary Health Care* (2002). It is pertinent to note that the investigator did not confirm the presence of these guidelines. However, in one isolated incident, one doctor, upon being asked, was unable to produce the SEMDSA guideline, stating that it was left in the car on that day.

Healthcare staff also regarded various other items as useful 'guidelines' for planning care. For example, two CHCs had unofficial guidelines supplied by a pharmaceutical company (Norvo Nordisk). Information from medical journals and the physician's own experience were also cited by two doctors as practice-informing. Two CHCs (site 6 and 7) had the chronic disease of lifestyle (CDL) stamp system initiated by the MDHS. But only one of the two CHCs (site 7) cited it

as a ‘guideline’; the other cited it as a record –keeping system. One particular CHC (site 3), though not having the official care guideline, had multiple other resources to guide and monitor care (see table 5).

Thus, every CHC reported using some form of guideline at least.

(c.) Care Support Structures

A number of facility-based structures and mechanisms to support diabetic patients were identified at CHCs, and these varied from facility to facility. Some of the support systems were community-based (see Table 6).

Table 6: Availability of diabetes care support structures									
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
STRUCTURE									
Diabetes club	☒	☒	☒	☒ *	☒ *	☒	☒	☒	☒
Diabetes support group	☒	☒	☒	☒	☒	☒	☒	☒	☒
Therapeutic group	☒	☒	☒	☒	☒	☒	☒	☒	☒
Other	Exercise group		Repeats club (planned)		Patients Referred to local Diabetes society		Patients Referred for informational and moral support at local library		

* regarded by respondents as diabetes ‘day’

All but two CHCs reported having diabetic clubs, five described having therapeutic groups, and four said that diabetes support groups were in place. However, healthcare staff at CHCs had different understandings of the names of care support structures the evaluation tool purported to assess. There seemed to be confusion about the difference between ‘diabetes club’, ‘diabetes day’, ‘diabetic clinic’ and ‘therapeutic group’. Two institutions reported referring patients to a local diabetes society and a library for miscellaneous support.

(d.) **Reported equipment availability**

Table 4 below shows the types and numbers of medical implements available at facilities and used for routine medical checks and screening for complications.

Table 7: Reported equipment availability

	Weight Scale	Height meter	Tape (waist)	BP machine	Obese cuff	Glucometer	Ophthalmoscope	Snellens chart	Tuning fork	Patella Hammer	ECG machine	BMI charts	EQUIPMENT CALIBRATION
SITE													
1	1	1	0	7	2	1	?	?	2	4	1	3	Somewhat systematic
2	2	2	0	10*	1	2*	10	1	1	1	2	2	unsystematic
3	2	1	0	8	3	3	4	4	1	4	1	3	Somewhat systematic
4	2	1	2	3	1	2*	1	2	1	3	1	0	Unsystematic
5	2	1	2	6	2	1	4	1	1	3	1	0	Unsystematic
6	1	1	3	6*	4	2	4	4	1	3	1	2	Unsystematic
7	2	1	1	10*	3	2	11*	1	2	1*	2	1	On indication
8	6	1	2	4	2	2	6	2	1	3	1	2	systematic
9	1	1	2	12	2	8	12	2	2	13	2	?	systematic

* estimate

? respondent was not sure of the number

It can be seen from the above table that, with the exception of some ‘zeros’ registered for waist measurement tapes and BMI charts, at least one unit of every equipment type was available at each facility. All equipment was reported to be functioning at the time of auditing, although glucometers were frequently reported to be old and having a high breakdown rate. Coupled with staff shortages and high patient loads, especially on diabetes days, the generally poor availability of enough Snellen charts commonly created a bottleneck in service delivery. However, though ECG machines and waist tapes were fairly available at all CHCs, the related medical procedures were not performed, as is shown in tables 10 and 11.

Only 2 facilities had a systematic plan for calibrating equipment; the others did not calibrate at all, or calibrated only some equipment, or calibrated only on indication.

The high frequency of **estimated** numbers of equipment units reported in the table is worrisome. The researcher noticed that in some instances numerical data was reported perfunctorily by staff respondents, and without reference to equipment inventories.

(e.) Staff complement

Table 8: Staff numbers and their level of involvement in diabetic care

SITE		1		2		3		4		5		6		7		8		9	
STAFF TYPE	STAFF QUANTITY	Total	Active in diabetes	Total	Active in diabetes	Total	Active in diabetes	Total	Active in diabetes	Total	Active in diabetes	Total	Active in diabetes	Total	Active in diabetes	Total	Active in diabetes	Total	Active in diabetes
CNP		0	0	2	2	3	2	1	1	0	0	4	2	5	4	3	3	1	1
PN		4	1	5	5	2	0	1	1	6	3	11	3	22	19	0	0	1	1
SN		4	0	7	7	2	0	2	2	1 ^b	1	2	1	13	11	1	1	0	0
MO/GP		3	3	4	4	3	2	1	1	3	2	3	3	10	10	1	1	1	1
HPO		1	1	1	1	0	1 ⁺		#		1	2	1	6	6	6	6	1	1
Diabetes educator		1	1	0	0	1	1		*	0	0	0	0		*	0	0	1	1
Dietician		1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	1 ⁺	1
Nutrition advisor		0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

CNP: clinical nursing practitioner; PN: professional nurse ; SN: staff nurse ; MO/GP: medical officer or general practitioner; HPO: health promotion officer ; +based elsewhere ; # 'rcps' ; * institution considers all staff to be educators ;

^b enrolled nursing assistant

Diabetes educators, dieticians and nutrition advisors are in short supply across all facilities. There is a discernible correlation between number of staff and the patient population for a facility; the facility with the largest diabetic population (site 2) has considerably higher numbers of general practitioners, professional , and staff nurses involved in diabetic care, while the facility with second biggest diabetic

population(site 7) has the highest number of staff of all categories. Most of the staff available at any given CHC is involved in diabetic care.

(f.) Drug supply

Good supply of anti-diabetic medication is a critical component in the management of diabetes. Table 6 below shows drug supply at CHCs.

Table 9: Typical drug availability at CHCs

INDICATOR OF DRUG SUPPLY	Type of Medication		
	Insulin vials ^a	Insulin pensets ^b	Oral agents ^c
No. of facilities reporting drug currently in stock	100%	100%	100%
No. of facilities reporting NO stockout in past 12 months	89%	44%	78%
No of facilities reporting Occasional stockouts in 12 months	11%	56%	22%

a Humulin R (Actrapid); Humulin N (Protophane); Humulin 30/70

b Actraphane; Actrapid ; Protophane

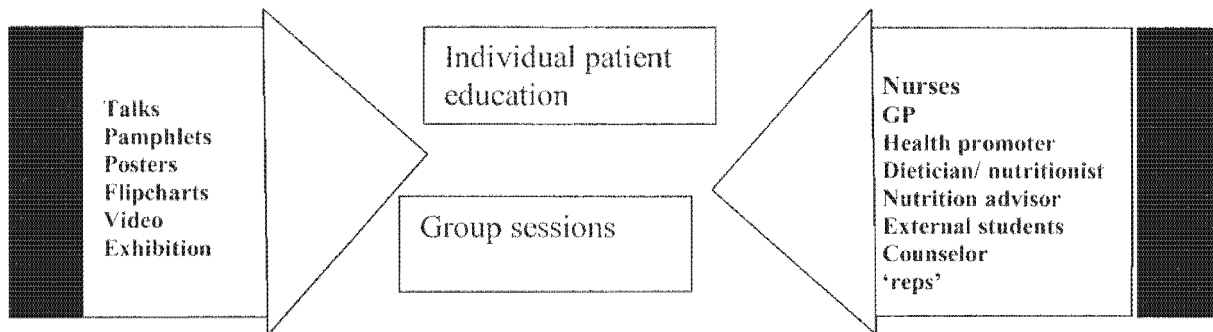
c Glibenclamide(Daonil) ; Gliclazide (Diamicon) ; Metformin (Glucophage

All CHCs reported having complete stocks of all three types of anti-diabetic therapy *at the time of the audit*. Insulin vials had the best overall supply, followed by oral agents. Insulin pensets, on the other hand, had irregular annual supply, with as many as five (5) CHCs reporting occasional stockouts. Inter- facility borrowing of drugs, as well as, less commonly, proximity to the central drug depot, were cited as factors contributing to consistent drug supply in the year.

(g.) Patient Education

Figure 1 below shows the pool of resources (material and human) used for educating patients at CHCs. It should be stated from the outset, however, that the language type and appropriateness of the educational tools was not evaluated.

Figure 4: Patient Educational Tools and Nursing Cadres responsible for Educating



The survey found out that the commonly cited tools for patient education were talks, pamphlets, posters and video, although the first two were the most common, being cited by every CHC. Less commonly, two CHCs cited flip chart and exhibition respectively.

Both individual and group patient education was being administered at CHCs. On the whole, CHCs reported administering individual education daily or on the first and every subsequent patient visit; some however said that they only administer education “when necessary”.

The nurse (all categories) was the most frequently cited cadre for individual patient education, followed by the physician (GP), then the health promoting officer. The dietician or nutritionist was the least commonly cited. One CHC cited use of a counsellor in educating patients.

For group education, the GP was never cited, not unexpectedly. The nurse once again topped the list as the most common educator, followed by the health promoter and then representatives (“reps”) from pharmaceutical companies. However, the general understanding at CHCs was that every staff member is responsible for educating patients.

The frequency of group sessions ranged from once weekly to once monthly. One of the two CHCs that use ‘reps’ allowed a gap of up to 3 months between educational sessions.

Structural weaknesses

The study identified some areas of concern in structural mechanisms existing at CHCs.

These are shown in table 10 below.

Table 10: Summary of major weaknesses in elements of the healthcare system

- Informal borrowing of drugs among CHCs
- Insulin recycling
- Non-systematic calibration of equipment
- Non documentation of drug stockouts
- Non-reference to equipment inventory by staff when being audited
- Non –reference to staff inventory when being audited
- Non-recording of the amputation status of amputees on their folders
- The haphazard state (or internal disorganization) of patient folders
- Disharmony in folder sticker systems, care tool used and patient accessories provided
- Use of absolute (versus relative-BMI) weight reduction to mark patient improvement

There is a pervasive tendency among CHCs to “borrow” certain medication from each other to offset stockouts. Currently this arrangement is not officially formalized by provincial authorities, and may become uncontrolled and cause problems. There is also evidence that CHCs withdraw and restock unused insulin from now controlled patients who no longer need it. Such a mechanism may be questionable because of the unknown storage conditions for the insulin at the patient’s home. During the audit, it also became clear that most pharmacy staff were not systematically documenting drug stockouts, resulting in them having to use memory recall to estimate the number of annual stockouts. Likewise, the numbers of equipments available and total staff establishments were furnished without reference to standard inventories. This distracts from data accuracy. With some exceptions, patient folders were often internally disorganized and in ruffled state, with the prescription and follow-up sheets not arranged in any chronological order. Sometimes the doctor’s

consultation notes were written on the prescription chart instead of the follow-up sheet, and vice versa. This, among other things, can complicate the audit process for future auditors. There are huge inter-facility variations in types and availability of care systems and resource. For example, there were different colours for folder stickers among CHCs, and the internal tools and resources used to manage and monitor diabetes care (e.g. provision of insulin vials to patients for home self management) varied from CHC to CHC. Overweight patients are encouraged to lose a certain amount of weight to achieve a certain 'target' weight. With the low frequency (only 15%) of BMI calculation and recording witnessed at CHCs, such weight loss targets might not be ideal.

Process Aspects of quality of care

(a). Routine tests

Table 11: Frequency of performance of routine clinical tests at each patient visit in a 12-month period

Total patient visits Mean (range) N=20 folders/ site	3.7(2-6)	7.4(3-12)	4.9(3-7)	3.4(2-6)	3.5(2-7)	4.7(2-7)	3.5(2-7)	3.5(2-7)	4.5(2-9)	
	Site1	Site 2	Site3	Site4	Site5	Site6	Site7	Site8	Site9	ALL
Random sugar	85%	78%	91%	92.5%	82.6%	54.8%	93%	97%	79.8%	83.7%
Fasting sugar	0%	0%	0%	3%	2.9%	5.4%	0	0.01%	0.01%	1.26%
BP	89%	68%	89%	80%	75.4%	44%	93%	93%	68.5%	77.8%
Weight	77%	74%	80.4%	87%	53.6%	29%	0.01%	18.6%	57.3%	53%

It can be seen that the frequency of routine examination performance at each patient visit was quite high for random blood sugar (mean 83.7%), fairly high for BP and weight measurement (mean 77.8% and 53% respectively), and almost next to nothing for fasting blood sugar (mean 1.26%). Six CHCs, measured random blood sugar on $\geq 80\%$ of the patient's visit. The lowest rate for random sugar measurement was 54.8% (site 6).

Outstandingly, site 7 virtually did not perform any weight measurements, while site 6 discernibly had the lower frequencies for most tests.

(b). Annual tests

Table 12: Number of patients receiving annual clinical examinations

N=20 folders / site	Site1	Site2	Site3	Site4	Site5	Site6	Site7	Site8	Site9	ALL(%)
Lipid profile	0	1*	0	1*	1*	0	0	0	0	3(1.7%)
HbA1C	0	0	0	0	0	0	0	0	0	0 (0%)
Fundoscopy		1	4	1	0	4	1	5	0	16(8.9%)
Visual acuity		1	4	0	1	3	1	3	1	14(7.8%)
Ser. Creatinine	0	3	2	0	0	2	1	2	0	10(5.6%)
Proteinuria	2	0	2	3	0	0	0	2	11	20(11%)
Comprehensive foot exam	3	1	3	2	0	3	0	2	0	14(7.8%)
ECG	2	1	0	0	0	0	0	0	0	3(1.7%)

* done elsewhere

It is clear from the table that annual tests are not done as frequent as expected by practice guidelines; the number of patients receiving the key annual examinations is very small for all CHCs. In fact, none of the clinics were performing glycated haemoglobin (HBA1c) tests, while the rest of the tests were performed to a very minimal extent (on less than 5% of patients for each CHC). Staff also reported that they do not do baseline ECG; they only perform the procedure on patients indicated as high-risk. The frequency of fundoscopy and visual acuity performance was not assessed for site 1, which had a separate eye unit (and separate patient eye assessment records) located in a separate geographical place.

Patient Outcome (intermediate)

Table 13: Patients' level of biochemical control on each of the 3 most recent visits

Patients with:	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	TOTAL(%)
RBG$\geq$0mmol/L:										n=180
▪ All 3 visits	7(50%)	7(41%)	4(20%)	1(6.2%)	4(33%)	3(38%)	3(25%)	4(13%)	5(36%)	38 (29%)
RBG>15mmol/L :										
▪ All 3 visits	2(1.4%)	1(5.8%)	1(5%)	0%	0%	1(17%)	1(8%)	0%	0%	6 (3.4%)
BP$\geq$30/80mmHg:										
▪ All 3 visits	12(71%)	10(59%)	8(40%)	1(9%)	3(38%)	2(33%)	10(50%)	13(82%)	3(25%)	62 (45%)

As seen on table 12 above, 3.4% of all patients had uncontrolled blood sugar on each of the three latest visits to the CHC, using the glycaemic control target of $\leq 5\text{mmol/L}$ stated in the 2002 SEMDSA guideline. Using a more stringent cut-off of 10mmol/L , the proportion uncontrolled on three visits rises to 29 % (range: 13%-50%), while about 45% of the patients had higher- than- normal blood pressure (BP $\geq 130/80\text{mmHg}$).

Structure-process interrelationships

Table 14: Relationship between equipment availability and performance of respective process	
Facilities reporting having ECG machine(s) available	9 (100%)
Facilities performing ECG	2 (22%)
Facilities reporting having waist measurement tape(s) available	6 (67%)
Facilities doing waist measurements on patients	1 (11%)

While all facilities had the necessary equipment to perform electrocardiography (ECG), only two did so, each performing on only a single patient. For one other patient folder that had an ECG output inside, the procedure was performed elsewhere. Of the 6 facilities that reported having a waist measurement tape, only one performed the procedure (on one patient).

Reasons given for deviation from standard practice

Table 15 : Reported reasons for non-implementation of recommended care structures and processes by CHCs

No appointment system or register	System did not work well in the past, and patients have low literacy levels and do not have home or mobile telephones
No diabetes register	Staff shortage
No diabetes club	Staff shortage
Poorly-functioning therapeutic group	No buy-in from patients
Non-calibration of equipment	Equipment still new
Non-performance of annual exams on patients	Staff shortage ; tests expensive
Non-performance of fasting blood glucose	Patients on insulin therapy must eat Patients tend to eat before coming to clinic, even if forbidden
Non-performance of fundoscopy	No trained staff
Non-use of the chronic disease stamp	No coloured paper

One CHC that attempted to use the appointment register system reported having abandoned the plan because the system did not work well; patients had low literacy levels and did not have home or mobile telephones where they could be easily contacted to arrange appointments. Staff shortage was the main reason given for not instituting a diabetic register or club, and for not performing annual clinical tests on patients. Fundoscopy was particularly constrained by absence of trained staff, while high cost was another reason given for not performing annual checks like lipids and HBA1c. While non-calibration of equipment was found to be generally widespread among CHCs, one CHC that was also not calibrating said that they needed not calibrate new equipment. Nursing staff said that it was difficult to do fasting blood glucose tests because patients on insulin needed to synchronize their medication with food, and non-insulin patients come to the clinic having eaten, in any case. Many CHCs did not advance a reason for not using the ‘chronic disease of lifestyle stamp’, but the few that gave an explanation said that they did not have the relevant coloured paper.

CHAPTER 7:

DISCUSSION

This study which developed a multifaceted audit tool has identified numerous deficiencies in care delivery at primary care level in Cape Town metropole region.

Response rate

There was a gratifying 100% response rate for the nine CHCs selected and for the number (twenty) of folders audited per CHC. This was due to a number of factors. First, the strong central support for the process; this even extended to the provision of transport to the health centers. Second, the use of a dedicated external auditor to visit each CHC. This improves validity of the findings. Earlier experiences from the pre-study pilot and other local studies have shown that the response rate is lower when CHCs are given the audit tool to complete on their own and send it back (by fax, post, etc). The goal of auditing twenty folders per CHC was also easily achieved, because folders were sampled at source. As resource and time limitations could not allow a second visit, a single day was allocated for auditing each CHC.

Participant characteristics

In keeping with previous audits of diabetes care in the Western Cape, the majority of patients were women. This may be explained by greater health-seeking behaviour by women, more females than males in the Cape Town metropole, or that the clinics are only held during the day, rendering it difficult for people with constant employment (that is, more males) to attend. The extent of co-morbidity of diabetes and hypertension among patients was surprisingly high; overall, about 81% of the surveyed Type 2 diabetics were currently taking antihypertensive medication, and at each CHC, the rate was no less than 60%. Forty seven percent (47%) of these patients were aged 60 years

and older. Levitt and colleagues (1996) observed hypertension (defined as use of antihypertensive therapy or BP recording of 160/95mmHg on more than three successive visits) being present in 53.7% of patients, 34% of whom were aged 61 years and older. In America, at least 40% of people with diabetes have high blood pressure (American Diabetes Association, 2000), while Mahan and Escott-Stump (2004) put this figure at 50%. The higher rate of hypertension may be explained by a number of factors, namely and older age group than the previous Cape Town study (Levitt et al, 1996), over prescription of antihypertensive therapy, and bias in selection of patient folders.

Nonetheless, in light of this evidence, a case should be made for the delivery of a comprehensive package of care for chronic diseases, including hypertension, at the point of delivery, since such diseases often converge, especially in the older patient (*Standard Treatment Guidelines and Essential Drugs List*, 2003). Routine screening and primary and secondary prevention of diabetic complications, as well as tight metabolic control in the patient should be considered, re-emphasized or introduced as a matter of policy in primary facilities. It is notable that as many as ninety-two percent (92%) of surveyed patients did not have their smoking history recorded in their clinic folder. The few that did were all identified as smokers. This may suggest that assessment of smoking status is symptom-driven and incidental instead of protocol-driven. Clearly, assessment of smoking status is a matter for consideration given the importance of smoking as a risk factor for cardiovascular disease and the beneficial effects of smoking cessation (Ingelsson et al, 2006).

Drug supply and Regimen options

Continuous supply of anti-diabetic medication is a critical component in the management of diabetes, yet the current study found that, within a 12-month period, occasional stockouts were reported for insulin vials, insulin pensets and hypoglycaemic agents by 11%, 56% and 22% of facilities respectively. These are unacceptably high proportions, as shortage of such lifesaving drugs like insulin should never occur at any facility. However, these figures were based on recollection by the pharmacists, not on actual records, casting doubt on the validity of the data they reported. It is likely that pharmacy staff could have under-reported drug stockouts since this would reflect negatively on them. One of the primary healthcare targets stated in South African Department of Health Guidelines (the *National Programme for Control and Management of Diabetes Type 2 at Primary Level*) includes 'ensuring the permanent availability of oral anti-diabetic agents, insulin, syringes, and other drugs'. All facilities reported having enough stocks of all drug types at the time of auditing, although this was not verified. It was also noted that some CHCs did not regard acute drug supply interruptions (of less than or equal to a day) as a stockout. Also, our discovery that facilities 'borrow' drugs from each other to offset drug outages is congruent with what Leon(2002) found out in her study on district health system development in the western Cape. Therefore, it is conceivable that stockouts could be occurring more frequently than revealed by our study.

Information systems

The disparate nature of clinical and administrative record keeping systems existing at primary facilities in the Cape Town metropole was quite apparent. For example, all but one CHC had a colour-coded sticker system to flag diabetic patient folders, but five

different colours were used across CHCs (blue, red, orange, pink and yellow). The sticker system simplifies retrieval of patient folders for routine clinical care and was handy for our audit. Institution of a similar colour for each condition across all facilities should be targeted at provincial level, in the interest of a unified health care system.

To some extent, each CHC was found to be deficient in some of their record-keeping systems. Overall, only about 33% of the facilities had a fixed register for diabetes patients, and only one facility reported having a computer-based register. Registers for diabetic patients have a number of uses, such as planning of patient management strategies, recall, and reminders for missed appointments. Electronic systems across facilities should be targeted at provincial level. This would permit institution of a computer-based register, which would be ideal since it has the advantage of ease of access and processing, simultaneous access by multiple users or institutions, and are conducive for research activities (www.gunston.gmu.edu). It was interesting to note that to some CHCs with paper-based information systems, computerization seems a remote possibility in the wake of the currently under-resourced healthcare system of the Western Cape province.

Care Support Structures

Although a good number of facilities reported having diabetic clubs, therapeutic groups, and support group, these responses will need further verification since there seemed to be confusion among CHC personnel about the meanings of these terms. This may be because these structures are not stated in our local guidelines, and a therapeutic group is a new concept in the Cape metropole (introduced in 2005 among selected facilities). No solid diabetic club committees were identified at facilities, most of which equated a diabetes 'club' to routine diabetic clinic sessions or 'diabetic days' held at facilities

about once or twice per week. Implementation of such structures is important for empowering the patient, since self-management is a crucial component of diabetes care.

Staff and equipment availability

Restricted availability of staff and equipment impacts negatively on quality of care.

“We are short-staffed here” is a popular refrain among CHC staff, referring to the high staff- patient ratio at their facilities. To a great extent, this is true for both staff skills and numbers. Inadequate supply of health personnel is a critical problem in South Africa (South African Health Review, 2003/4). Healthcare staff claim that such scarcities preclude effective performance of guideline-recommended procedures like foot examinations, weight measurement at every patient visit, height measurements, and institution of sustainable diabetes clubs. Although we found a significant number of nurses and doctors actively involved in diabetes care, it should be recognized that the same staff are also involved in care for many other diseases. Therefore, the superficial impression of adequate staff availability created by our study should be reviewed with caution. Furthermore, in concurrence with findings from a chronic disease survey by the Western Cape Department of Health in 2006, the required range of multi-disciplined health professionals that should compose the newly introduced chronic care management team (CCMT), namely health promoter, nutritionist, pharmacist, physiotherapist, occupational therapist, and a social worker does not exist at facilities. It is also acknowledged that ordinary nurses are not skilled to perform funduscopy and comprehensive foot exams, or to interpret ECGs, which leaves the GP with much to do. Some facilities had some nurses nominated for training in funduscopy and foot examinations.

Although the most recent (2002) SEMDSA guidelines have no stipulations on equipment, we evaluated facilities' equipment against standards of the older (1997) SEMDSA version, in addition to conventional clinical wisdom and good care practices. The study found that almost every essential equipment item was available, although these were mostly not being calibrated. The value of equipment is limited if not calibrated, since this gives incorrect results and impacts on outcome.

Patient Education

The SEMDSA guideline (2002) maintains that patient education and nutritional counselling are the cornerstone of effective diabetes care and sufficient time and resources should be made available in order to do this effectively. Although facilities reported having a good supply of material resources for group and individual patient education, the services of dietitians, nutrition advisors, diabetes educators, and health promotion officers were in short supply. One nursing staff voluntarily acknowledged that their patients needed more education and empowerment for self-management. Non-compliant patient practices like irresponsible smoking, poor eating habits and non-adherence to medication identified among diabetic clients must be corrected by proper lifestyle and diet education. For example, it was reported that patients have a habit of taking meals before coming for consultations; hence nurses said that they could not measure patients' fasting blood sugar.

Guideline availability and usage

The study exposed poor availability and presumably the use of practice guidelines, although this was not evaluated. The approved clinical practice guidelines are not optimally available in CHCs. Only 3 CHCs had the official *SEMDSA Guideline for*

(2002) at the time of auditing. We found that a wide range of other documents or resources are consulted by physicians and nurses as guidelines for patient care. These vary from facility to facility and some have not come from the health authorities, and therefore may need to be checked from time to time. For example, a couple of facilities were using practice guidelines from pharmaceutical companies, and some physicians still firmly hold on to applying their clinical discretion. Another South African study by Daniels and colleagues (2000) also found out that diabetes care guidelines were infrequently consulted by doctors, attributing this to time constraints on the part of the staff and passive dissemination of guidelines without accompanying education of health professionals, among many other barriers. This is a matter of concern as adherence to guidelines is necessary for standardising and improving diabetic care. Daniels and colleagues (2000) further reported that some health professionals believe that conditions like diabetes and hypertension are complex and cannot be managed by guidelines. It is noteworthy that the various local guidelines available for use at primary level demonstrate inconsistencies. For example, the most recent SEMDSA guideline and the 'Standard Treatment Guidelines and Essential Drugs List for primary level' do not mention requisite staff equipment for diabetic care (comprehensive equipment and staff standards are found in the older (1997) SEMDSA version). The Primary Health Care Package for South Africa has other recommendations, for example on patient records and community-based services, aspects which are absent from other guidelines. Also, in none of the locally available guidelines are there direct stipulations on diabetic 'clubs', therapeutic groups, or other care support structures addressed in our study. In the light of this, the idea of a common guideline incorporating all the crucial care aspects for diabetes is worth of consideration by higher authorities.

Deficiencies in organisation of care

Our study endorses the fact that there are structural and procedural deficiencies in the organisation of health care delivery in primary care in the Western Cape and in other areas in South Africa, a reality also noted by Daniels and colleagues (2000), and detailed in Table 10. Of note is the dominantly paper-based (non-digital) health information systems. In addition, existing diabetic care support systems like diabetes clubs are inharmonious across facilities. We also identified some non-standard practices like insulin recycling and inter-facility drug borrowing/lending. Insulin recycling, for example, is a particularly worrying problem because of the possibility of compromised storage and handling at the client's home. The South African Department of Health's *National Programme for Control and Management of Diabetes Type 2 at Primary Level* guidelines state that insulin-treated patients, together with their family and friends should be educated in insulin storage. It is known that unopened insulin vials or cartridges should be stored between 2°C to 8°C (<http://www.bddiabetes.co.uk/cgi-bin>). But, while patients may receive such education, they may not have the storage resources (e.g. fridge). 'Drug borrowing' on the other hand may encourage a dependency syndrome and discourage prompt reordering of drugs by pharmacies. These inefficiencies are safely extrapolatable to most, if not all, other local primary facilities not included in our study.

Care and management processes

We found that there is an extremely low rate of the performance of laboratory investigations which are included in annual review. There is substantial evidence that this is due to budgetary constraints; mention should be made of the case of a memorandum (undated and unsigned) shown to the auditor by one CHC, issued by

MDHS authorities, ordering medical officers to '*reduce to a minimum, and preferably STOP*' requests for certain laboratory tests, including cholesterol and triglyceride tests. One staff member was also quoted saying: "*HBA1c is only done when deciding which course of action to take for first-comer patients and borderline patients, but doctors rarely ever ask for it*". Yet, according to most recent (2002) SEMDSA guidelines, HBA1c should be assessed twice yearly (if the patient is stable) or quarterly (if treatment is changed or if the patient is not meeting goals). Staff also reported that they do not do baseline ECG, the examination only being done on patients indicated as high-risk. It is apparent that budgetary constraints are having an impact on optimal patient management. This is likely to have a deleterious effect on staff morale. On the other hand, except for weight measurement, random sugar and blood pressure assessment, clinical examinations like foot and eye examinations were also not done annually. These are critical aspects of care and if due to high patient load and lack of skills, innovative solutions are necessary.

Structure-process inter-relationships

It was notable that although equipment was available, not all of it was being used. Examples include ECG machines and tape measures for waist circumference. Consequently equipment shortage cannot be the reason for non-performance of clinical procedures; and the few instances when ECG and waist circumference were measured are likely to have been incidental rather than proactive. Cumulatively, the reasons our study identified for not performing required procedures range from structural (e.g. no coloured paper for the CDL stamp), to shortage of human resources, and to budgetary constraints. It is conceivable that factors like personnel attitudes and patient compliance may also contribute.

Patient outcome

It is notable that a significant proportion of patients whose folders were reviewed had poor blood pressure and to a lesser extent poor blood glucose control. About 29% of patients had suboptimal glycaemia (random blood glucose ≥ 10 mmol/L), and about 45% had had higher than normal blood pressure (BP $\geq 130/80$ mmHg) on each of their three most recent visits to the CHC. It is likely that a significantly greater proportion would have been defined as having poor glucose control if the cut-off had been lowered to 8 mmol/L. This poor biochemical control is a matter of concern as good blood pressure and glucose control can prevent or retard progression of complications. The huge variability in the proportion of uncontrolled patients should be noted; and there may be reasons for this, for example, differences in patient compliance, supply of medication, patient self-management knowledge, and elements of structure, like availability of diabetes clubs and specific staff. These factors need to be explored and ameliorated if outcome for people with diabetes is to be improved.

The audit tool

Our experience from the audit was that, in its current state, the tool is simple and easy – to-use. It was commended by stakeholders for its ability to evaluate healthcare *structure, process* and *outcome* simultaneously, recognizing that these three aspects of quality do converge and influence each other at typical healthcare setting like a CHC, and hence must be evaluated simultaneously and continuously.

On the other hand, the many –levelled data sources necessary for informing the indicators in an audit situation complicates the audit exercise, especially if administered

by one auditor, and given the usual business of nursing staff at primary facilities. The different sections of the tool require more than one nursing staff per facility to complete. This, coupled with the huge information demand of the tool, imposes considerable strain on the under-staffed CHCs, especially given the high-speed mode of a rapid appraisal. The tool was administered using a single day at each facility, although if it is to be applied with accompanying independent verification by the auditor, more time needs to be budgeted.

There were a number of limitations and potential sources of bias in this study, such as:

- Methodological limitations

1. Exclusion of the patient perspective from investigation, owing to logistical limitations.
2. There was no independent verification of the availability or implementation of processes and structures (e.g. equipment and care guidelines).
3. In some cases there was incongruence of information supplied by different staff respondents about the same clinical aspect, e.g. number of equipment available at the CHC.

- Potential sources of bias

- The menu of options provided on the tool could have caused respondents to tick a favourable answer, resulting in reporting bias.
- The tendency of the healthcare providers to impress the researcher, known as the *Hawthorne effect*, cannot be ruled out in this study.
- Pharmacists seemed to consistently over-report unflawed drug supply, for fear of victimisation (due to their failure to timeously reorder drug stocks)

- Foreknowledge by health care staff (through study introduction by the researcher) of the intention of the study to investigate whether a particular diabetic patient (folder) was also hypertensive is likely to have caused some staff to preferentially select, during the sampling exercise, those folders with coloured sticker labels for both diabetes and hypertension.
- The exclusion of those folders with less than two documented visits in 12 months actually excluded extreme cases of non-documentation (or non-performance) of clinical procedures.

University of Cape Town

RECOMMENDATIONS AND CONCLUSION

Use of this audit tool has identified numerous deficiencies in health care delivery for people with diabetes. It has also highlighted areas that require intervention

We fully recognize that a number of these interventions can be implemented without imposing significantly large additional pressure on the budget, and hence should be feasible even with our limited healthcare resources(eg documenting drug stockouts, using colour-coded folder stickers, keeping equipment inventories and so on.

Recommendations:

- The tool produced and validated in this study is at the disposal of local health authorities to apply continuously to evaluate care if need be. Responsible health authorities in the Western Cape province should aim to evaluate quality of care for diabetes and other conditions at the classical three levels of *structure*, *process* and health *outcome*, instead of evaluating one aspect at a time.
- The internally disorganized state of patient folders at some clinics needs to be corrected to avoid loss of folder contents, to simplify access and retrieval of information for routine care and ongoing research purposes.
- Provincial authorities need to reinforce documentation of every drug stockout, no matter how acute, for purposes of drug supply management, monitoring and improvement.
- Facilities should keep easily accessible inventories of currently available equipment and personnel (by category and name) at their facility, in order for them to give reliable information and avoid ‘finger-counting’ during audit sessions.

- Provincial authorities should commit towards unifying diabetic care systems and approaches across all facilities. This includes:
 - 1) Institution and implementation of standard guidelines
 - 2) Use of condition-specific patient folder sticker colour for diabetes and other chronic conditions like asthma
 - 3) Institution of therapeutic groups and chronic disease of lifestyle (CDL) stamp, diabetic register, diabetes club
 - 4) Ensuring continuous drug supply to the CHCs. The practice of informal borrowing of medication among facilities needs to be investigated and controlled by provincial authorities, since it may destabilize drug supply at lending facilities. Prompt re-ordering of stock should be emphasized among pharmacy attendants.
 - 5) Recording key, non-changing patient information like height, amputation status, and date of diagnosis with diabetes if known, and possibly smoking status, in one central place in the patient's folder for easy identification. The latter, albeit mobile, should also be documented in a quick- to –identify manner or location.
 - 6) Providing adequate financial resources for biochemical testing.
 - 7) Provincial authorities should ensure that appropriate writing paper is provided for recording patient information. We found out that consultation notes and prescriptions were being written on various, informal, and sometimes untidy pieces of paper. In some instance documentation was transposed or mixed; drug prescriptions were sometimes written on continuation forms, and doctor's notes sometimes written on prescription charts, or the two were inter-mingled.

- Provincial authorities should investigate reasons advanced by staff for deviating from guideline-specified procedures before condemning the staff.

In Conclusion:

- A dilemma exists in the undertaking of a detailed audit at busy primary facilities as found in the metropole; for faster information retrieval and expediency it would seem worthwhile to advise CHC personnel to prepare in advance for an audit on a stated date, but it is very likely that in the foreknowledge of what will be evaluated, personnel will present an unrealistic, favourable (false or biased) picture of their care systems and practices, for fear of reprisal. This is more so if the audit is initiated or backed by provincial leadership.
- In the same vein, while the aspiration of the MDHS for participatory or self-auditing of facilities whereby nursing staff are actively involved in their own evaluation, improves buy-in from staff, this calls for more staff time and may disrupt daily healthcare activities. For this reason our study could not adopt this approach.
- Reasons advanced by health personnel as precluding effective care delivery should not be ignored, but used as a springboard to improve quality of care for diabetic clients in our healthcare system.
- Rolling out this diabetes audit tool to all the CHC in the Western Cape and other provinces should be considered in order to standardize and ensure delivery of acceptable, high -quality care for people with diabetes in our healthcare system.

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APPENDIX 1

INTERVIEW GUIDELINE* (Key Informant Interviews)

Date of interview : _____
Place / CHC : _____
Name of interviewee : _____ Code: _____

Post/ designation : _____
(specify nurse type)
Employing Authority : _____

Year of first employment at : _____
place /CHC :

Structural, Process and Outcome indicators

GUIDE QUESTIONS:

- 1) How comprehensive is this set of indicators?[Appendix 2]
- 2) Do the indicators capture the complete picture of quality of diabetic care?
- 3) Which indicator(s) do you think is/are relevant or important?
- 4) What data sources are needed for measuring each indicator?
- 5) What is the degree of availability of that data?
 - At CHC level, including your CHC?
 - At district/ regional level?
- 6) How do you rate the quality of that data?
- 7) What do you think are the respective roles of a doctor and a nurse on the diabetic care process and hence the process indicators?
- 8) Which indicator(s) do you think is/are feasible applicable or necessary at the primary level, in terms of skills, data availability, etc?
- 9) Which indicator(s) do you think is/are NOT feasible , applicable or necessary at the primary level?
- 10) Which indicator(s) do you think should be removed? Why?
- 11) Which other important indicator(s) do you think should be added?

* Response recorded by interviewer on a separate recording sheet

APPENDIX 2: Indicators and their definitions

PROCESS INDICATORS
■ RISK FACTORS FOR COMPLICATIONS ▪ Blood glucose: ○ Proportion of diabetics with blood glucose measured at each visit to the CHC ○ Proportion of diabetics with at least two HbA1c tests done in a period of 12 months ▪ Blood pressure: ○ Proportion of diabetics with blood pressure measured at each visit ▪ Obesity/Overweight: ○ Proportion of diabetics with BMI measured initially ○ Proportion of diabetics with weight measured at each regular visit ▪ Lipid profile: ○ Proportion of diabetics with at least one lipid profile assessment done in a period of 12 months
■ ROUTINE EXAMINATIONS FOR DIABETES COMPLICATIONS ▪ Eye: ○ Proportion of diabetics with at least one eye examination (fundoscopy) done in a period of 12 months ▪ Foot: ○ Proportion of diabetics with at least one comprehensive foot examination done in a period of 12 months ▪ Renal: ○ Proportion of patients with their creatinine level examined at least once a year ○ Proportion of patients with microalbumin and urine protein measured in one year ▪ Cardiovascular: ○ Proportion of patients with an ECG examination done in at least 12 months ○ Proportion with auscultations done at every visit
OUTCOME INDICATORS
■ INTERMEDIATE OUTCOMES /RISK FACTORS FOR COMPLICATIONS ▪ Blood glucose: ○ Proportion of diabetics with hyperglycemia (blood glucose >15mmol/L) ○ OR proportion of diabetics with blood glucose under control ($\leq$ 5mmol/L) ○ Proportion of diabetics with normal HbA1c ($\leq$ 8 %) ▪ Blood pressure: ○ Proportion of patients with hypertension (BP $\geq$ 30/80)
STRUCTURAL INDICATORS
■ Staff complement: ○ Existence of a core multidisciplinary care team consisting of GP, nurses, diabetes educator, dietician, and so forth.
■ Drugs, equipment & Supplies: ○ Availability of essential equipment in working order at time of visiting ○ Availability of drugs, insulin and other supplies at time of visiting

○ Availability of uninterrupted drug supplies in previous year
■ Diabetes club:
○ Existence of a dedicated diabetes club
■ Diabetes education:
○ Provision of diabetes education (individual or group)
○ Existence of recommended/ useful educational tools and staff
■ Care guidelines ,Standards or Policies:
○ Availability and <i>application</i> of the most recent, nationally recognized diabetes care guidelines
○ Availability and use of other recognized diabetes guidelines
■ Record/ information system:
○ Existence of an up- to-date diabetes register
○ Existence of appointment register(s)
○ Existence of a patient folder labelling(sticker) system
■ Referral network:
➤ Access to a phone and fax to make referral arrangements

University of Cape Town

APPENDIX 3: Corroborative interview guideline (staff interviews)

INTERVIEW GUIDELINE

Date of interview : _____
Name of CHC : _____
Name of interviewee : _____ **Code:** _____
Designation/responsibilities : _____
Employer:(Province/Unicity): _____
Year of first employment at Facility : _____

GENERAL QUESTIONS

- How is diabetes care currently being monitored in your institution, and the Western Cape in general?
- What proportion of patients is type 2 diabetic?

INDICATORS

STRUCTURE	Notes
• Guideline available? If yes, which guideline(s)? • Guideline being used? • Data capturing system: patient(diabetes) register available? Computer or hand-held records? • Staff complement: how many doctors, nurses, diabetes educator, dietician? • Medical supplies or drugs available (at time of visit) • Drugs Supplies constant and regular? Any erratic supplies over the years? • Chronic budget constraints? • Staff complement (GP, nurses, dietician, diabetes educator). • What role does each cadre have in diabetes care? • Diabetes clinics/clubs being done?- how often ,and Who is responsible? • Referral system: facility linked to a secondary facility? • Ease of contact for opinion or support • Integrated care?	

PROCESS	
• Are all the care processes recommended by the SEMDSA diabetes care guidelines being followed? • Which care process(es) is/are the practitioner(s) doing/not doing? • If not, why are the processes not being done? • Any problems/constraints? • Which indicators, if any, do you think are/NOT feasible at the primary level?—availability of relevant skills/competence? • Which indicator(s) would you add to the ones already contained in the guidelines? • Ease of availability of data to feed the indicators?	
OUTCOME	
• Are the outcome indicators recommended by the SEMDSA diabetes care guidelines being achieved? • Which care outcome(s) is/are not being achieved? • Why? Any problems? • Which outcome indicators, if any, do you think should /should NOT be assessed at the primary level? — availability of relevant skills/competence? • Why or why not? • Which other outcome indicators do you think should be added? • Is the data (routine or otherwise) to feed the indicators easily recorded, well- recorded and/or readily available?	

APPENDIX 4 : PERMISSION TO CONDUCT RESEARCH

School of Public Health and Family Medicine
University of Cape Town
Rondebosch 7700

21 June 2005

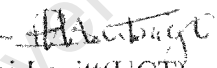
Community Health Services Department
Woodstock

Dear Dr Martell and Dr Daya

RE: Permission to conduct research

We would like to apply for permission to conduct research in community health centers (CHCs) in the Capetown metropole. The title of the project is '*Indicators of Diabetic Care (Type 2) at the Primary Level: A Pilot Study in the Capetown Metropole region*'. The aim of the study is to develop indicators that can be used in primary care clinics to determine quality of care for diabetes. Data collection will entail interviewing staff, making non-participant observations on activities at the health centers, as well as analysing some patient and other clinical records. Six districts of the metropole region will be involved, namely the Central, East, West, South, Tygerberg west and the South Peninsula districts. (The other districts will not be included due to accessibility problems). We will be limiting the study to a random sample of the larger CHCs, ie those that have more than 200 patient visits per month. Although the specific CHCs to be included have neither been selected nor contacted, this will be done as soon as possible and you will be made aware immediately. We have attached a copy of the research proposal for your consideration.

Yours faithfully

Bernard Mutsago (UCT) — 
Supervisor: Professor Naomi Levitt (UCT)

Appendix 5

UNIVERSITY OF CAPE TOWN



Research Ethics Committee
E52 Room 24, Old Main Building Groote
Schoor Hospital, Observatory, 7925
Queries : Lamees Emjedi
Tel : (021) 406-6338 Fax: 406-6411
E-mail : lemjedi@curie.uct.ac.za

08 July 2005

REC REF: 250/2005

Prof NS Levitt
MEDICINE

Dear Prof Levitt

**INDICATORS OF DIABETES (TYPE 2) CARE: A PILOT STUDY IN THE
CAPE TOWN METROPOLE**

Thank you for your letter to the Research Ethics Committee dated
21/05/2005.

It is a pleasure to inform you that the Research Ethics Committee has formally
approved the above-mentioned study.

Please quote the REC. REF in all your correspondence.

Yours sincerely


PROF T. ZABOW
CHAIRPERSON

ENQUIRIES
NAVRAE
IMBUZO

DR R MARTELL

TELEPHONE:
TELEFON
HOWUNI

460 9114

REFERENCE
VERWYSING
ISALATHISO

**Dr Daya
460 9118**

DATE
DATUM
UMHILA

25 .06.05

PROVINCIAL ADMINISTRATION: WESTERN CAPE

Department of Health

PROVINSIALE ADMINISTRASIE: WES-KAAP

Departement van Gesondheid

ULAWULO LWEPHONDO: INTSHONA KOLONI

Isebe Lezempilo

Bernard Mustsago
University of Cape Town

RE: Permission to conduct research

Permission is hereby granted to conduct your research. When visiting the centres consent and co-operation must be obtained from the local manager and service delivery must not be compromised. Consent must also be obtained from each client and the clients' privacy must be respected.

Please provide the facility managers with an approval certificate from the Medical Ethics Board at your University.

Please contact the facility managers at the designated Community Health Centres (CHC) as per the address list attached.

Once the research is completed, please submit a report to this office.

Yours sincerely

Dr Daya
Chief medical Officer
MDHS



29 August 2005

Department of Medicine

J-Floor · Old Groote Schuur Hospital Building
Groote Schuur Drive · UCT Medical School
Observatory 7925 · Cape · South Africa
Telephone: (+27-21) 406-6197
Fax No: (+27-21) 448-6815

To Whom It May Concern:

Re: Indicators of diabetes (type 2) care: A pilot study in the Cape Town metropole

Mr Bernard Mutsago, an M Phil student at UCT, is conducting this study under the supervision of Professor Dinky Levitt and Dr Rob Martell.

Would you please assist him in his endeavours.

Please phone either Dr Martell or myself should there be any queries.

Yours sincerely

Prof N S (Dinky) Levitt

Head

Division of Diabetic Medicine & Endocrinology

J47 OMB, GSH

University of Cape Town and Groote Schuur Hospital

Tel +27-21-4045007 / Fax +27-21-4066513

Email: suebotha@uctgsh1.uct.ac.za

APPENDIX 7: Consent form for CHC staff participants

CONSENT FORM

I hereby seek your permission to participate in this research.

I am a Masters student in the Department of Public Health at the University of Cape Town. I wish to conduct a research at this health facility and am asking for your participation in an interview.

The research is a pilot of a proposed tool for the evaluation of diabetes. It involves a face- to- face interview with you about some aspects of diabetes, namely:

1. structural aspects of diabetes care
2. process indicators of care
3. outcome indicators of care

I will also be compiling information from clinic records like clinic register, statistics sheets, policies, and some other documents, and may approach you on an ongoing basis for your clarification and input in this regard.

Your participation in this research is purely voluntary. There are no perceived risks or dangers that may affect you as a result of participating in this study. Your identity will be kept confidential, but the information you provide may be made widely available through publication. The conduct of this research is a requirement (dissertation) for the completion of my MPH degree, but the collected information will also be used in many other ways for the benefit of the diabetic community in South Africa. The results, implications and recommendations of the study will be forwarded to health authorities to assist in making future plans to improve diabetes care at this facility and other facilities in the metropole region.

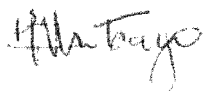
You will receive a formal feedback of the results in due course.

Your participation in this research is greatly appreciated.

Please sign the consent slip attached overleaf as proof of your agreement to participate. Should you require any further information about the study, do not hesitate to contact me or the project supervisor professor Naomi Levitt [contacts provided].

Thanking you in advance.

Bernard Mutsago



CONSENT SLIP

I, _____ (name& designation)

Give my consent to taking part in the research about diabetes care at this health facility _____ being conducted by Mr B. Mutsago. The purpose and objectives of the research have been made clear to me and I am aware that I am free to withdraw from participation at any time, for any reason.

Signature: _____

Date: _____

University of Cape Town

APPENDIX 8 : OBSERVATION GUIDELINE

Things To Be Taken Note of Include:

- i. Overall healthcare environment prevailing at the facilities
- ii. Typical (and atypical) diabetes activities and events that go on.
- iii. Waiting times for patients
- iv. Staff workload
- v. Data recording procedures
- vi. Interactions of patients and healthcare staff
- vii. General availability of basic equipment, drugs and other critical resources.
- viii. General availability of the right materials: right cuff size, calibrated weighing scales
- ix. General availability and accessibility of care guidelines, and other important documents.

University of Cape Town

Date: (ddmmyy)		INDIVIDUAL DATA CAPTURE SHEET (to be completed for each patient folder)		Folder No.....	
Name of CHC		Code		Total No of visits in past 12 months (for diabetic consultation only)	☐ ☐ ☐
GENERAL INFORMATION					
D.O.B(ddmmyy): NR ☐ Sex (tick): M ☐ F ☐ NR ☐ Height:metres NR ☐ (tick)					
On hypertension treatment? Y ☐ N ☐ NR ☐ Smoking? (tick) Y ☐ N ☐ NR ☐ Current BMI: (calculate) _____ kg/m ²					
Current treatment regime: (tick) Oral agents only ☐ Insulin only ☐ Oral + Insulin ☐ Diet & exercise ☐					

PROCESS INDICATORS

ROUTINE TESTS		Frequency of tests done in past year	MEASUREMENTS		
TEST / PROCEDURE			measurement 1	measurement 2	measurement 3
Random BG			mmol/L	mmol/L	mmol/L
Fasting BG			mmol/L	mmol/L	mmol/L
BP			mmHg	mmHg	mmHg
Weight			Current wt: _____ Kg		
Waist circumference			_____ cm		
ANNUAL TESTS					
Lipid profile			Done elsewhere ? ☐	T/Chol: _____ mmol/L LDL-Chol: _____ mmol/L	
HbA1c			Done at CHC? ☐	HDL-Chol mmol/L: _____ TGs: _____ mmol/L	
			% (Done by CHC) (tick) ☐ Done elsewhere ☐ (tick)		
OUTCOME INDICATORS					
Eye assessment	Fundoscopy		Retinopathy: Y ☐ N ☐ NR ☐ Cataracts: Y ☐ N ☐ NR ☐		
	Visual acuity		Visual acuity: L _____ R _____ Other diabetic eye problems? Y ☐ N ☐ NR ☐		
Renal assessment	Serum Creatinine		Serum creatinine: _____ μmol/L ☐ NR Nephropathy? Y ☐ N ☐ NR ☐		
	proteinuria		μalbumin : Y ☐ N ☐ NR ☐ Protein +: Y ☐ N ☐ NR ☐		
Foot examination	General		Any amputation : Y ☐ N ☐ NR ☐ Poor sensation: Y ☐ N ☐ NR ☐ Ulcer(s): Y ☐ N ☐ NR ☐		
	Comprehensive		Abn pulses : Y ☐ N ☐ NR ☐ Gangrene: Y ☐ N ☐ NR ☐ No Reflexes : Y ☐ N ☐ NR ☐		
Cardiovascular assessment	ECG		ECG abnormal: Y ☐ N ☐ MI: Y ☐ N ☐ Stroke: Y ☐ N ☐ CCF: Y ☐ N ☐		
	Ascultation		Any acute coronary symptoms? Y ☐ N ☐		

Date: (ddmmyy)

STRUCTURAL INDICATORS
 (to be completed for each CHC)

Name of CHC 1

Record keeping

- Diabetic register available? Y ☐ N ☐ If Yes, is it electronic? Y ☐ N ☐
- Stickers on diabetic folders Y ☐ N ☐ If Yes, what colour?
- Other info- systems: Tick sheets: Y ☐ N ☐ Appointment register: Y ☐ N ☐
- Other info system(s) (specify).....

Care guidelines**Types/forms of guidelines:**

1=poster on wall

2= pocket size

3=book/booklet

4= laminated A4 size

Guideline(s) in use:

- SEMDSA 2002 Y ☐ N ☐ What form is it in? ☐
- Essential Drug List Y ☐ N ☐ What form is it in? ☐
- Other? N ☐ Y ☐ (specify).....

Support structures

- Therapeutic group Y ☐ N ☐ Any planned? Y ☐ N ☐
- Diabetes club: Y ☐ N ☐ Any planned? Y ☐ N ☐
- Support group: Y ☐ N ☐ Any planned? Y ☐ N ☐
- Other support systems Y ☐ N ☐ (specify):

Staff	Total No.	No. involved in diabetes care?
1.Clinical NP	☐ ☐	☐ ☐
2.Professional Nurse	☐ ☐	☐ ☐
3.Staff/Enrolled Nurse	☐ ☐	☐ ☐
4.Medical officer GP	☐ ☐	☐ ☐
5.Health Promotion Officer:	☐ ☐	☐ ☐

Staff	Total No.	No. involved in diabetes care?
6.Diabetic educator:	☐ ☐	☐ ☐
6.Dietician:	☐ ☐	☐ ☐
7.Nutrition advisor:	☐ ☐	☐ ☐
8.Podiatrist:	☐ ☐	☐ ☐

Equipment	Available?	Quantity	Equipment functioning	When last calibrated?	Equipment	Available?	Quantity	Equipment functioning	When last calibrated?
Scale	Y ☐ N ☐		Y ☐ N ☐		Ophthalmoscope	Y ☐ N ☐		Y ☐ N ☐	
Height meter	Y ☐ N ☐		Y ☐ N ☐		Snellen chart	Y ☐ N ☐		Y ☐ N ☐	
Tape(waist)	Y ☐ N ☐		Y ☐ N ☐		Tuning fork	Y ☐ N ☐		Y ☐ N ☐	
BP machine	Y ☐ N ☐		Y ☐ N ☐		Patella hammer	Y ☐ N ☐		Y ☐ N ☐	
Obese cuff	Y ☐ N ☐		Y ☐ N ☐		ECG machine	Y ☐ N ☐		Y ☐ N ☐	
glucometer	Y ☐ N ☐		Y ☐ N ☐		BMI chart(s)	Y ☐ N ☐		Y ☐ N ☐	

Drugs	Currently In stock?	No of stockouts in past year	Accessories available (at time of visiting)	
INSULIN VIALS			For clinic use:	For patient use(home):
Humulin R/ Actrapid	Y ☐ N ☐	☐ ☐ : Don't know (tick)	Urine dipstix: Y ☐ N ☐	BG strips: Y ☐ N ☐
Humulin N/ Protophane	Y ☐ N ☐	☐ ☐ : Don't know	BG strips: Y ☐ N ☐	Urine gluc strips Y ☐ N ☐
Humulin 30/70/ Actraphane	Y ☐ N ☐	☐ ☐ : Don't know		
INSULIN PENSETS			FOR RESEARCHER'S USE : NOTES	
Actraphane	Y ☐ N ☐	☐ ☐ : Don't know (tick)		
Actrapid	Y ☐ N ☐	☐ ☐ : Don't know		
Protophane	Y ☐ N ☐	☐ ☐ : Don't know		
ORAL AGENTS				
Glibenclamide	Y ☐ N ☐	☐ ☐ : Don't know (tick)		
Gliclazide	Y ☐ N ☐	☐ ☐ : Don't know		
Metformin	Y ☐ N ☐	☐ ☐ : Don't know		
Diabetes education				
Individual ptnt education:	Not done ☐ Done ☐ How often?..... Who does ?			
Group sessions:	Not done ☐ Done ☐ How often?..... Who does ?			
Tools used:	Talks Y ☐ N ☐ Pamphlets Y ☐ N ☐ Posters Y ☐ N ☐ Video Y ☐ N ☐ Other N ☐ Y ☐			
Referral network				
•2° referral facilities used by CHC: 3° referral facilities •Ease of access to 2°/3° level or for peers for opinion : Telephone easily available at CHC ?Y ☐ N ☐ Fax easily available ?Y ☐ N ☐				

Date: (ddmmyy)		INDIVIDUAL DATA CAPTURE SHEET (to be completed for each patient folder)		
Name of CHC	Code	Total No of visits in past 12 months		
GENERAL INFORMATION				
Folder No:		D.O.B(ddmmyy): Smoking? (tick) Y ☐ N ☐ NR ☐		
Sex (tick): M ☐ F ☐		Height:metres NR ☐ Date of diagnosis with diabetes (ddmmyy):		
Current treatment regime: (tick) Oral agents only ☐ Insulin only ☐ Oral + Insulin ☐ Diet & exercise ☐				

ROUTINE TESTS		Frequency of tests done in past year	MEASUREMENTS	
TEST / PROCEDURE			measurement 1	measurement 2
Random BG			mmol/L	mmol/L
Fasting BG			mmol/L	mmol/L
BP			mmHg	mmHg
Weight			Current weight: _____ Kg	
Waist circumference			_____ cm	
ANNUAL TESTS				
BMI done at first visit to CHC		BMI initially Y ☐ N ☐ (tick)	Current BMI: _____ kg/m ² (calculate)	
Lipid profile			T/Chol: _____ mmol/L LDL-Chol: _____ mmol/L HDL-Chol mmol/L: _____ TGs: _____ mmol/L	
HbA1c			_____ % (Done by CHC only) Done elsewhere ☐ (tick)	
			OUTCOME	
Eye assessment	Fundoscopy		Retinopathy: Y ☐ N ☐ NR ☐ Cataracts: Y ☐ N ☐ NR ☐	
	Visual acuity		Visual acuity: OK ☐ Poor ☐ NR ☐ Other eye problems? Y ☐ N ☐ NR ☐	
Renal assessment	Serum Creatinine		Serum creatinine: _____ μmol/L ☐ NR	
	proteinuria		Nephropathy? Y ☐ N ☐ NR ☐ μalbumin / prot +ve: Y ☐ N ☐ NR ☐ Other: Y ☐ N ☐	
Foot examination	General		Any amputation : Y ☐ N ☐ NR ☐ Poor sensation: Y ☐ N ☐ NR ☐ Ulcer(s): Y ☐ N ☐ NR ☐	
	Comprehensive		Abn pulses : Y ☐ N ☐ NR ☐ Gangrene: Y ☐ N ☐ NR ☐ No Reflexes : Y ☐ N ☐ NR ☐	
Cardiovascular assessment (ECG)			No ECG output sheet Y ☐ N ☐ ECG abnormal: Y ☐ N ☐ MI: Y ☐ N ☐ Stroke: Y ☐ N ☐ CCF: Y ☐ N ☐ Any acute coronary symptoms? Y ☐ N ☐	

DATA CAPTURE SHEET: STRUCTURAL INDICATORS

(Complete for each CHC)

Record keeping

• Diabetic register available? Y ☐ N ☐ If Yes is it electronic? Y ☐ N ☐

OR

• General chronic disease register? Y ☐ N ☐ If Yes is it electronic? Y ☐ N ☐

• Other info- systems: Tick sheets: Y ☐ N ☐ Appointment register: Y ☐ N ☐

• Other (specify)

Care guidelines

Types/forms:

1=poster on wall
3=book/booklet

2= pocket size
4= laminated A4 size

Guideline(s) in use:

• SEMDSA 2003 Y ☐ N ☐ What form is it in? ☐

• Essential Drug List Y ☐ N ☐ What form is it in? ☐

• PHC Package for SA Y ☐ N ☐ What form is it in? ☐

• Other? N ☐ Y ☐ (specify)

Support structures

• Therapeutic group Y ☐ N ☐ Any planned? Y ☐ N ☐

• Diabetes club: Y ☐ N ☐ Any planned? Y ☐ N ☐

• Support group: Y ☐ N ☐ Any planned? Y ☐ N ☐

• Other support systems Y ☐ N ☐ (specify):

Staff	Available?	If YES, how many?
1.Clinical NP	N ☐ Y ☐	
2. Professional Nurse	N ☐ Y ☐	
3. Staff/Enrolled Nurse	N ☐ Y ☐	
4. Medical officer/GP	N ☐ Y ☐	
5. Health Promotion Officer:	N ☐ Y ☐	

Staff	Available?	If YES, how many?
6. Health educator:	N ☐ Y ☐	
6. Dietician:	N ☐ Y ☐	
7. Nutrition advisor:	N ☐ Y ☐	
8. Podiatrist:	N ☐ Y ☐	

Equipment	Available?	Quantity	Equipment functioning	When last calibrated	Equipment	Available?	Quantity	Equipment functioning	When last calibrated
Scale	Y ☐ N ☐		Y ☐ N ☐		Ophthalmoscope	Y ☐ N ☐		Y ☐ N ☐	
Height meter	Y ☐ N ☐		Y ☐ N ☐		Snellen chart	Y ☐ N ☐		Y ☐ N ☐	
Tape(waist)	Y ☐ N ☐		Y ☐ N ☐		Tuning fork	Y ☐ N ☐		Y ☐ N ☐	
BP machine	Y ☐ N ☐		Y ☐ N ☐		Patella hammer	Y ☐ N ☐		Y ☐ N ☐	
Obese cuff	Y ☐ N ☐		Y ☐ N ☐		ECG machine	Y ☐ N ☐		Y ☐ N ☐	
glucometer	Y ☐ N ☐		Y ☐ N ☐		Other			Y ☐ N ☐	

Drugs	Currently In stock?	Overall supply in past year	Accessories available (at time of visiting)	
INSULIN VIALS			For clinic use:	For patient use(home):
Humulin R	Y ☐ N ☐	Good : ☐ Bad : ☐ (tick)	Urine dipstix: Y ☐ N ☐	BG strips: Y ☐ N ☐
Humulin N	Y ☐ N ☐	Good : ☐ Bad : ☐	BG strips: Y ☐ N ☐	Urine gluc strips Y ☐ N ☐
Humulin 30/70	Y ☐ N ☐	Good : ☐ Bad : ☐		
INSULIN PENSETS			Blood sampling apparatus:	
Actraphane	Y ☐ N ☐	Good : ☐ Bad : ☐	Needles: Y ☐ N ☐	
Actrapid	Y ☐ N ☐	Good : ☐ Bad : ☐	Tubes : Y ☐ N ☐	
Protophane	Y ☐ N ☐	Good : ☐ Bad : ☐	Tonikel: Y ☐ N ☐	
ORAL AGENTS			Webco: Y ☐ N ☐	
Glibenclamide				
Gliclazide				
Metformin				
Diabetes education				
Individual education:		Not done ☐ Done ☐ Who does ? ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐		
Group sessions:		Not done ☐ Done ☐ How often? Who does ? ☐ ☐ ☐ ☐ ☐ ☐ ☐		
Tools used:		Talks Y ☐ N ☐ Pamphlets Y ☐ N ☐ Posters Y ☐ N ☐ Video Y ☐ N ☐ Other N ☐ Y ☐		
Referral network •2° referral facilities used by CHC: 3° referral facilities •Ease of access to 2°/3° level or for peers for opinion : Telephone easily available at CHC ? Y ☐ N ☐ Fax easily available ? Y ☐ N ☐				