

**THE NATIONAL SERVICE FRAMEWORK  
FOR DIABETES  
(NSFD)**

**MAURITIUS**

**A ten-year Programme**

(Putting people living with diabetes at the heart of health care services)

**March 2007**

## FOREWORD

Diabetes is being recognized now as the hidden epidemic of the 21st Century and indeed the biggest epidemic in human history. It is a chronic disease associated with tremendous human, social and economic suffering.

In 2003, an estimated 246 million adults had diabetes worldwide and it is expected that this figure will rise to 380 million individuals by 2025 (Diabetes Atlas 2006, International Diabetes Federation and International Diabetes Institute). This is a 55% increase.

Diabetes is directly responsible for as many deaths as HIV / AIDS, and causes many more, if indirect mortality from cardiovascular disease is included. Every 10 seconds, a person dies of diabetes. This pandemic is threatening to overwhelm global healthcare services.

The very survival of many indigenous people around the world is threatened by diabetes. Many countries have already developed a national strategy against diabetes, for instance the National Service Framework for diabetes in the United Kingdom and national diabetes strategies in Finland and Australia. Nearer to us, the International Diabetes Federation (IDF) (African Region) together with WHO-AFRO and the African Union has developed a diabetes strategy for Africa.

Mauritius has unfortunately not been spared by diabetes. In fact we have one of the highest prevalence of diabetes in the world with nearly one in five of our adults above the age of 30 years suffering from diabetes. The tragedy is that half of those affected, do not know that they have the disease. Furthermore, in very few of those who know that they have diabetes, is the condition under control. As a result many Mauritians are affected and crippled by many of the complications of diabetes such as cardiovascular diseases, kidney failure, blindness, damaged nerves to limbs and amputations secondary to peripheral vascular disease. More than one in five deaths is caused by diabetes.

For too long now the threat from diabetes has not received the attention required. The threat is very real in terms of the immense human, social and high economic costs and even more real in terms of its likelihood to overwhelm our healthcare services in the near future. Nearly every family in Mauritius is confronted directly or indirectly with the suffering associated with diabetes.

Conscious of this alarming situation, Government has made it a priority and in fact has been visionary enough to include in its programme the formulation of a National Service Framework for Diabetes (NSFD) for Mauritius. Indeed a 20<sup>th</sup> December 2006 United Nations General Assembly Resolution has emphasised the need for Member states to develop national policies for the prevention, treatment and care of diabetes.

The Prime Minister has personally ensured that this task is given a high priority by delegating a team in the Prime Minister's Office to jumpstart work on the NSFD. The NSFD falls in the vanguard of this government to put people first and therefore to move the person living with diabetes to the heart of our health service.

The NSFD lays out the strategies for diabetes prevention and standards of diabetes care and the interventions required for them to be achieved. At the outset it has to be recognized that the task is Herculean and it cannot be achieved overnight. In fact it can realistically be said that a ten-year time scale will be required for the standards to be achieved.

I would like to end by thanking all those involved in the preparation of the NSFD. I would also like to reaffirm my support and commitment for progress to be made in work towards implementation of the NSFD standards.

The Honourable, Satya Veyash Faugoo,  
Minister of Health and Quality of life.

## EXECUTIVE SUMMARY

Diabetes affects people of all socio-economic and ethnic backgrounds. In Mauritius, over the past 20 years, a significant increase in the number of people with diabetes has been documented. Between 1986 and 1997, there was a 40% increase in persons with diabetes. At present around 15% of adults aged 20 years and over have the disease and many more are likely to suffer from it during their lifetime. In those aged above 30 years, nearly 20% have diabetes. Nearly half of the people with diabetes do not know that they have the disease.

Diabetes is associated with huge human and economic costs, as it affects the physical, psychosocial and general well-being of those with the disease and their families, because of the associated complications such as heart disease, stroke, renal failure, amputation and blindness. However, available evidence shows that:

- ✓ Type 2 diabetes can be delayed or even prevented,
- ✓ Good control increases life expectancy and reduces risks of complications in both Type 1 and Type 2 diabetes and
- ✓ Self-management is the mainstay of effective diabetes care.

Judicious and extensive use of available knowledge and resources can greatly reduce the enormous ill-health, disability and death associated with the disease.

This National Service Framework for Diabetes for Mauritius ( NSFD ) is based on materials from the United Kingdom Department of Health NSFD document, the diabetes action plans of other countries such as Finland and Australia and on the Diabetes Strategy paper for Africa, an initiative of the IDF ( Africa Region ) developed in partnership with the WHO-Afro and the African Union. It has been developed with inputs from all stakeholders, involved in diabetes care locally and from three international experts in diabetes care, namely Professor David Owens, diabetologist and Adviser to the Welsh Government on diabetes care Sir George Alberti , diabetologist and key adviser to the U.K Prime Minister on Health matters and from Professor Paul Zimmet, diabetologist and Director of the International

Diabetes Institute, Adviser to the Australian Federal Government and Victoria State, Australia.

The present document

- lays down the foundation for the implementation of a 10- year programme that will make optimal use of and enhance available resources to ensure better outcomes in the prevention and control of diabetes in Mauritius
- sets out to build up a computerised registry for all people living with Type 1 and Type 2 diabetes
- outlines an in-depth review of the organisational structure such that delivery of diabetes care is totally reengineered
- includes 14 standards and key interventions that are important for improving the primary, secondary and tertiary prevention and care of diabetes in Mauritius
- sets out the framework for the conduct of research in diabetes care and thus enabling the establishment of the evidence base for local policy formulations

### **Aims of the NSFD**

The NSFD aims at

- recognizing those people with diabetes who do not know that they have diabetes before they develop complications
- recognizing those people at high risk of developing diabetes. A programme will be developed to delay or prevent the onset of diabetes based on the use of current knowledge
- undertaking a vast empowerment programme for people living with diabetes
- re-engineering all aspects of diabetes care such that modern and up to date diabetes care is delivered to the person living with diabetes. Health care professionals working with people living with diabetes

will be given appropriate training and all the tools necessary in order for this to be realized

- revamping of foot care with support from a podiatry service
- reorganisation of primary, secondary and tertiary prevention strategies

### **International Advisory Committee**

An International Advisory Committee comprising renowned diabetologists will be set up. This Committee will guide and give momentum to the implementation of the NSFD. It will help towards the development of Mauritius as a WHO Collaborating Centre for diabetes care for the Region and advise the Ministry on the setting up of a Mauritius Diabetes and Cardiovascular Institute.

## **ACKNOWLEDGEMENTS**

Our sincere thanks go to Hon. Navinchandra Ramgoolam, Prime Minister of Mauritius for his visionary initiative and strong commitment in considering diabetes as a national priority.

We thank Hon S.V. Faugoo, Minister of Health and Quality of life for his continued support during the drafting of this document.

We also thank Mrs. J.Veerapen, Senior Chief Executive, Mrs J. Brunel, Permanent Secretary and Dr.N.Gopee, Chief Medical Officer at the Ministry of Health and Quality of life for their continued support and encouragement.

We thank Professor David Owens, Diabetologist and Adviser to the Welsh Government, U.K, on diabetes care for his most valuable contribution to this document.

We also extend our warmest thanks to Professor Paul Zimmet, Director of the International Diabetes Institute, Adviser to the Australian Federal Government and Victoria State, Australia, for his input into the NSFD for Mauritius during his private visit on the island.

Our warmest thanks also go to Sir George Alberti, Key Adviser to the U.K Prime Minister on Health matters for his input into the document.

We also thank the numerous experts in the field of diabetes who produced the master document on the NSFD for the United Kingdom and allowed it to be freely available for reference.

We also thank Mr S.K. Sobee (Assistant Secretary) , Miss D. Chockalingum (Acting Confidential Secretary), Miss M. Florent (Executive Officer) at the Ministry of Health and Quality of life, and Mrs. A. Motallah ( Executive Officer ), and Mrs S. B. Lalloo ( Word Processing Operator ), at the Steering Committee on Biomedical Research and Technological Innovation at Prime Minister's Office .

**The Chairman & Members of the Committee on NSFD**

Ministry of Health & Quality of Life

## Table of contents

	Page Number
Foreword	
Executive Summary	
Acknowledgments	
Abbreviations	
Chapter 1- Background	
1.1    Some Essential Statistics	11
1.2    Health Care Delivery Points	11
Chapter 2 - Diabetes	13
2.1 The facts	13
2.2 Magnitude of the Problem	13
2.3 Human and Economic burden of diabetes	13
2.4 Types of diabetes	14
Chapter 3    A Road map on NCDs	15
3.1    Burden of Disease	15
3.2    NCD Survey 1987 and NCD Office	15
Chapter 4    Justifications for a National Service Framework for Diabetes	18
Chapter 5    Targets	21
5.1    Ten-Year Aims	21

Chapter 6	Standards	22
	6.1 Standards	22
	6.2 Details of Standards	24
Chapter 7	The Way Forward	36
Chapter 8	Cost of Diabetes and cost of the National Service Framework For Diabetes	38
	8.1 Cost of diabetes	38
	8.2 Cost of diabetes in Mauritius	39
	8.3 Cost of the NSFD	40
Appendices		
	Appendix A	41
	Appendix B	42

## **ABBREVIATIONS**

ABPI – Ankle Brachial Pressure Index.

CABG – Coronary Artery By-pass Grafting.

CAPD – Chronic Ambulatory Peritoneal Dialysis.

HbA1c – Glycosylated Haemoglobin.

HDL – High density lipoprotein.

HIEC – Health information, education and communication.

HIV / AIDS – Human immunodeficiency virus / Acquired immunodeficiency syndrome.

IDF – International Diabetes Federation.

IDI- International Diabetes Institute

IFCC – International Federation of Clinical Chemistry

IGT – Impaired Glucose Tolerance.

LDL – Low density lipoprotein.

NCD – Non communicable Disease.

NSFD – National Service Framework for diabetes.

OGTT – Oral Glucose Tolerance Test.

T2DM – Type 2 Diabetes Mellitus.

WDF- World Diabetes Foundation.

WHO- World Health Organisation.

WHO AFRO – World Health Organisation African Regional Office

# Chapter 1

## BACKGROUND

### 1.1 Some Essential Statistics

1.1.1 In the public sector, primary health care, curative and high-tech medical care, are provided free of any user cost at the point of use to the entire population. While the private health institutions cater for around 15% of total health care requirements, the public sector provides services to the remaining 85% of the population.

1.1.2 The public health expenditure per capita is around US\$ 105 or 2.1 % of GDP. Private expenditure on health is around US\$ 95.

1.1.3 Life expectancy has increased from 63 to 71 years during the last twenty years. For the period 2002-2005, life expectancy for males was 68.7 years and 75.6 years for females. Infant mortality rate has declined from 24.2 per thousand live births in 1987 to 13.2 per thousand live births in 2005.

1.1.4 Death statistics over the past few years show that over 80 % of deaths are due to non communicable diseases. In 2005, 37.1 % of deaths were attributed to cardiovascular diseases (many of which result from diabetes), 21.1 % to diabetes mellitus and 6.2 % to cancers.

### 1.2 Health Care Delivery Points

1.2.1 The delivery of Primary Health Care ( PHC ) in Mauritius is ensured by a network of 25 Area Health Centres, 126 Community Health Centres, 2 Medi-clinics, 1 Community Hospital and other satellite Primary Health Care institutions in Mauritius. In Rodrigues, such services are offered in 2 Area Health Centres and 13 Community Health Centres. As far as Agalega is concerned, the 2 available Health Centres are used to dispense Primary Health Care.

1.2.2 Secondary and tertiary services are delivered through five regional hospitals, four specialised hospitals, two district hospitals and one cardiac centre with a total bed capacity of 3,550. In Rodrigues, 1 general hospital and 2 area health centres, providing inpatient care have a total bed capacity of 178.

1.2.3 In 2005, twelve private clinics were operating in Mauritius, with a total bed capacity of 585. In addition, a number of private medical practitioners operate throughout the country.

1.2.4 Basic laboratory and radiological services are provided in the major health institutions. The Central Laboratory is at Victoria Hospital. In addition, diagnostic nuclear medicine facility is provided at Jawaharlal Nehru Hospital, MRI service at Sir Seewoosagur Ramgoolam National Hospital and CT-Scan services at Victoria Hospital, J. Nehru Hospital and SSRN Hospital.

## **Chapter 2**

### **DIABETES**

#### **2.1 The facts**

Diabetes is an illness which results from defects in the production, supply and effectiveness of insulin in the body. When we eat food, most of it is converted into glucose, (a form of sugar, which is a source of energy to our body.) Glucose is transported to the various parts of the body in the bloodstream. The hormone called insulin is needed for the absorption of glucose. Insulin is produced by a gland called the pancreas which is situated behind the stomach.

In persons with diabetes, either the pancreas does not produce enough insulin or the body cannot effectively use the insulin that is produced. Consequently the level of glucose in the blood becomes high. Subsequently, over a period of time, problems in different parts of the body occur.

#### **2.2 Magnitude of the Problem**

Many people in the world have diabetes. In 2003 it was estimated that 246 million people in the world have diabetes. It is forecasted that this number will reach 380 million by the year 2025 (IDF Diabetes Atlas 2006). In Mauritius, the NCD Survey done in 2004 shows that nearly one out of every five persons above the age of 30 years has diabetes.

#### **2.3 Human and Economic burden of diabetes**

Diabetes has a tremendous human cost in terms of human suffering. Diabetes is one of the leading causes of adult blindness or partial vision loss. It is responsible for at least 50% of non-traumatic lower limb amputation. Diabetes is one of the main causes of heart attacks. Persons with diabetes have a 2 to 3 times increased risk of heart attacks and

it makes people 2 times more likely to have strokes. It is also one of the main causes of renal failure. It frequently causes erectile dysfunction.

People with pre-diabetes have similarly high risk of heart attacks as those with established diabetes. Pregnancy induced diabetes and pregnancy in persons with diabetes can result in foetal damage and congenital deformities and the diabetes risk is passed on to the infant in terms of risk of diabetes in adulthood.

Type-2 diabetes was formerly a disease of adults but is now seen with increasing frequency in children and adolescents. Every 10 seconds a person dies from diabetes. The cost of treating diabetes is between 5% and 10% of total healthcare costs in many health care systems in the world.

## **2.4 Types of diabetes**

Type 1 diabetes – This accounts for less than 1% of our population. It generally occurs before the age of 30, most often in childhood or during adolescence. Type 1 diabetes results from auto-immune destruction of the pancreatic beta cells, the cells which produce insulin. In this form of diabetes, insulin is usually required for survival.

Type 2 diabetes – The majority of people with diabetes in the population suffer from this type of diabetes. In this case, there is a problem with both the production and the effectiveness of insulin action in the body. It has a strong genetic (familial) propensity which is unmasked by lifestyle factors such as obesity (hence the term “diabesity”) and lack of exercise.

At present, there is no cure for either type 1 or type 2 diabetes but with an effective preventive programme, accurate information, quality care and proper medication, a person with diabetes can live a long, healthy and happy life. Type 2 diabetes can be prevented with lifestyle measures and certain drugs that are used in the treatment of diabetes.

## **Chapter 3**

### **A ROADMAP ON NCDs**

#### **3.1 Burden of Disease**

Mauritius has registered a shift in the burden of diseases since the early nineteen eighties. Whilst at one time communicable diseases were the main problem, over the past decades, the major health concern has become the high prevalence of NCDs, namely Type-2 diabetes, hypertension / ischaemic heart disease and cancer. Communicable diseases have to a large extent been successfully controlled, with some diseases such as malaria having been eradicated.

#### **3.2 NCD Survey 1987 and NCD Office.**

In view of the alarming mortality statistics relating to cardiovascular diseases, a first Disease and Risk Factor Prevalence Survey was carried out in 1987 in collaboration with the International Diabetes Institute (IDI) based in Melbourne, Australia, with assistance from WHO and with two other Collaborating Centres besides the IDI namely the Department of Medicine, University of Newcastle, United Kingdom ( with Professor Sir George Alberti) and the National Public Health Institute, Helsinki, Finland ( with Professor Jaakko Tuomelhto).

The study confirmed the high rates of diabetes and cardiovascular risk factors and Mauritius was found to be amongst the countries with the highest prevalences of diabetes in the World.

Besides, to further advise and support the programme, an International Steering Committee was instituted with the assistance of WHO and comprising of the

abovementioned institutions. That Committee was composed of Prof. P. Zimmet, Prof. Alberti and Prof. J. Tuomehlito

In 1988, a Non Communicable Disease (NCD) Office was set up with the primary objective of conducting awareness campaigns against NCD risk factors and of advising the Ministry on legislative and fiscal measures so as to discourage the population in adopting harmful lifestyles.

In 1998, the NCD Office was converted to an NCD/Health Promotion Division with the main objective of “Reducing the Burden of Diseases due to NCDs through health promotion, integration and improvement of quality of care at primary health care level and epidemiological research”.

A managerial structure for the Division was instituted and had the task of integrating various units and programmes of the Ministry of Health & Quality of Life in one framework for better effectiveness and efficiency. Thus, the Mental Health and Substance Abuse Unit, the HIEC Unit, the Nutrition Unit, the Community Based Rehabilitation Programmed (CBR), the Primary Health Care (PHC), including the Medi-Clinics, UNICEF/UNFPA Projects and the Carnet de Santé Programme through the Community Health Unit, were integrated within the Division.

In 2001, the NCD Division was decentralized with an NCD Co-ordinator being nominated in each region but there was no focal point with technical expertise at the level of the Ministry of Health & Quality of Life to ensure coordination, monitoring and evaluation at national level.

During the past few years, a number of training programmes targeting doctors, nurses and paramedical staff have been undertaken. A set of protocols and guidelines for the prevention and management of NCDs has been developed by the Ministry of Health and Quality of Life and the Mauritius Institute of Health but uptake has been poor.

The health care delivery in health centres has been remodelled to ensure that most persons with diabetes are seen in NCD clinics with NCD nurses and nutritionists in

attendance. All basic drugs and medications have been made available at all health centres of the Republic.

There is ongoing screening for non communicable diseases at worksites by the “Caravanne de la Santé”. The screening has recently been extended to tertiary education centers and targeted screening on appointment has been introduced at Area Health Centres.

The Health Information, Education and Communication Unit focuses mainly on health promotion interventions towards the prevention of non-communicable diseases, reduction of risk factors and fostering healthy lifestyles through mass media, community activities and networking with relevant stakeholders.

The Nutrition Unit also organises a series of talks and cooking demonstrations across the island.

One health club has been set up in each region and facility for physical activity is being extended to other community points.

## Chapter 4

### JUSTIFICATION FOR A NATIONAL DIABETES SERVICE FRAMEWORK

- The high prevalence of diabetes increased from 14.3 % in 1987 to 19.5 % in 1998 and then decreased slightly to 19.3% in 2004 (age  $\geq$  30 years).
- On the positive side the prevalence of IGT (pre-diabetes) declined gradually from 19.3% in 1987 to 12.1% in 2004.
- Prevalence of obesity and overweight showed the same pattern as for diabetes – Obesity: 6.3% in 1987, 11.5% in 1998 & 10.3% in 2004 and overweight: 24.2% in 1987, 29.1% in 1998 and 25.4% in 2004.
- Prevalence of moderate/heavy leisure activity in age group 35-54 years increased in males from 11.8% in 1987 to 24.5% in 2004 and in females from only 1.4% in 1987 to 9.5% in 2004.
- Prevalence of hypertension did not change significantly at 30.2% in 1987 and 29.8% in 2004.
- Tobacco consumption decreased in males from 57.9% in 1987 to 35.9% in 2004, but for females it remained low at 7% in 1987 and 5.1% in 2004.
- The present diabetes prevalence places Mauritius as one of the countries with the highest prevalences of diabetes in the world. Since 1987, the prevalence has increased from 14.3% to 16.9% in 1992 and 19.5% in 1998. Since 1998, the prevalence appears to have stabilized.
- The primary prevention programme which started in 1988 has shown significant positive results, but the repeated surveys showed that detection of the disease and quality of care for diabetes and other NCDs, lagged behind with increasing

serious complications like renal failure, blindness, amputations and coronary heart disease/stroke with heavy cost implications.

- At present diabetes prevalence remains high in Mauritius and will probably continue to stay high for several years to come. There may be as many as 120,000 diabetics with nearly 50% of them not knowing that they have the disease.
- Most of these people with diabetes have poor control of their condition and consequently cardiac, vascular, neurological, eye and renal complications are likely to increase in the near future.
- Prevention and control of chronic diseases is a difficult and prolonged battle. It demands political support, adequate technology and private sector / community/ international support as well as committed technical staff.
- Among the NCDs, diabetes is the most costly and is also a major risk factor for other NCDs. Despite the continued efforts to provide an easily accessible diabetes service care to all patients, it appears that so far the service has satisfied neither the providers nor the users. Most of the clinics are overcrowded and the set-up does not favour optimal care and attention.
- Case ascertainment is poor as screening for diabetes remains a repetitive process and involves the whole of the adult population, which is an immense task. Diabetes care is still very much doctor-centered. The development of diabetic specialist nurses clinics has so far not been implemented and patient empowerment demands well-trained personnel and adequate educational level of patient.
- Appropriate equipment and trained/qualified resources need to be increased to prevent and manage effectively complications to prevent progression towards end stage organ failure;

- The National Service Framework for diabetes will ascertain that primary, secondary and tertiary prevention strategies be reviewed, strengthened and re-engineered.

## Chapter 5

### TARGETS

Our targets are generally guided by the Western Pacific Diabetes Declaration and Plan of Action (2000) and the African Diabetes Declaration and Strategy (2003). The targets are towards the achievement of specific 10-year Aims.

Based on the rate of the specific complications of diabetes, 10-year Aims will be as follows:

#### 5.1 Ten Year Aims

- To reduce new cases of blindness due to diabetes by one third or more.
- To reduce end-stage diabetic renal failure by at least one third.
- To reduce limb amputations for diabetic gangrene by one half.
- To reduce morbidity and mortality from coronary heart disease.

It is of paramount importance here to highlight that at present we do not have current data relating to the rate of specific complications of diabetes. The recent memorandum of understanding signed with Professor Zimmet of the International Diabetes Institute of Australia includes a morbidity/mortality surveillance study on a cohort of our diabetic patients. This will help us to obtain data in relation to the rate of specific complications of diabetes and thus establish the baseline in relation to our targets.

Furthermore the 10-year aims will only be achievable from the time that the specific standard or standards relating to the specific complication is successfully put in place., for instance , reducing new cases of blindness by one third or more would only be achievable with the implementation of an effective digital retinal screening programme and the laser therapy service necessary to deal effectively with those cases of diabetic retinopathy requiring laser treatment detected during the screening process.

## Chapter 6

### 6.1 STANDARDS

Fourteen (14) standards have been identified for implementation in Mauritius. These standards will be developed and will form the basis for improving the quality of care for people with diabetes and will also be the indicators for measurement of the performance of the health services with regards to diabetes care.

The broad standards are listed hereunder:

**a) STANDARD 1: Register clinical details of all people with Type 1 and Type 2 diabetes**

The setting up of a National Computerised Diabetes Register for Type 1 and Type 2 diabetes will be made operational in the 5 Regional Hospitals and in Rodrigues.

**b) STANDARD 2 : Prevention of Type2 diabetes**

The formulation and implementation of a culturally sensitive Diabetes Prevention Programme with a view to preventing Type 2 diabetes particularly in those at high risk eg those with a family history, past history of gestational diabetes etc

**c) STANDARD 3: Identification of people with Type 2 diabetes.**

Development of a National Strategy for improving case ascertainment.

**d) STANDARD 4: Empowering people with diabetes.**

Development of a systematic culturally sensitive educational programme and community-based support for people with diabetes to empower people with diabetes.

**e) STANDARD 5: Clinical care of adults with Type 2 diabetes**

Provision of culturally sensitive, evidence-based and protocol-driven clinical management and care of people with diabetes.

**£) STANDARD 6 : Clinical care of young people with Type 2 diabetes**

Provision of specific support and clinical care programme for young people with Type 2 diabetes.

**g) STANDARD 7 : Clinical care of people with Type I diabetes**

Optimisation of clinical care and support in children and people with Type 1 diabetes.

**h) STANDARD 8 : Management of diabetic emergencies**

Development, implementation & monitoring of agreed protocols for effective evidence-based management of diabetic emergencies.

**ï) STANDARD 9 : Care of people with diabetes during hospital admission**

Provision of appropriate and coordinated care and support to people with diabetes by multidisciplinary teams during their admission in hospitals.

**j) STANDARD 10 : Diabetes and pregnancy**

Provision of specialised multidisciplinary diabetes / pregnancy clinics to improve care during pregnancy to enhance maternal and foetal pregnancy outcomes.

**k) STANDARD 11 : Effective surveillance of complications**

Establishing a mechanism for effective surveillance of complications

1) **STANDARD 12 : Management of long term complications**

Establishment of evidence-based, protocol-driven effective management of long term complications in order to reduce risk of disability

m) **STANDARD 13 : Multi-agency care**

Setting up of an integrated health, community and social care mechanism with co-ordinated participation of non governmental organisations.

n) **STANDARD 14 : Research and Training**

Establishment of the necessary framework for research and training.

**6.2 Details of Standards**

Details relating to each of the standards are now outlined.

**STANDARD 1: Register clinical details of all people with Type I and Type 2 diabetes**

Aim: To have essential data on people with Type 1 and Type 2 diabetes at national level.

Key intervention will include compiling of data for both people with Type 1 and Type 2 diabetes. It will consist of entering relevant clinical details of each patient using the appropriate software. This will enable access to and analysis of the data on a regular basis for monitoring and evaluation.

**Implication for Service Planning**

Provision of computer hardware, appropriate software and training of staff for data entry and data analysis.

## **STANDARD 2: Prevention of Type2 diabetes**

Aim:- To reduce the number of people with Type 2 Diabetes

Key interventions will include:

Government Initiatives which would include:

- Advocacy
  - supporting national associations and non government organisations
  - promoting the economic case for prevention
  
- Community Support
  - Providing education in schools re: nutrition and physical activity
  - Promoting opportunities for physical activity through urban design (e.g. to encourage cycling and walking)
  - Supporting sports facilities for the general population
  
- Fiscal and Legislative
  - Examining food pricing, labelling and advertising
  - Enforcing environmental and infrastructure regulation e.g. urban planning and transportation policy to enhance physical activity
  
- Engagement of private sector
- Promoting health in the workplace
- Ensuring healthy food policies in food industry
- Media Communication
  - Improving level of knowledge and motivation of the population (press, TV and radio)
  - The Development of a National Media Strategy Plan to sustain awareness and

reinforce a sensitisation campaign to bring about change in lifestyle

- A targeted screening programme in people at risk of diabetes (family history of diabetes, prior pregnancy induced diabetes, metabolic syndrome, overweight / obese individuals). In selected cases OGTT ( oral glucose tolerance test ) may be required in order to diagnose pre-diabetes.
- A targeted intensive lifestyle intervention programme and pharmaceutical intervention if lifestyle measures are insufficient in groups at high risk of developing diabetes
- A school programme focussing on healthy eating and physical exercise

#### Implications for Service Planning

A National Action Plan on Physical Activity.

A National Nutrition Action Plan..

Overweight / Obesity clinics

Training of staff at various health points in risk assessment methods.

### **STANDARD 3: Identification of people with Type 2 diabetes**

Aim: To identify people living with Type 2 diabetes at an early stage.

Key Interventions will include:-

- The implementation of a National Awareness/ sensitization campaign to highlight symptoms and signs of diabetes.
- A targeted screening programme.
- Opportunistic screening at work sites.
- Screening at schools / universities and tertiary education centres.
- Screening in out reach regions.

#### Implications for Service Planning

Training of all stakeholders in awareness of symptoms/signs of diabetes (Health staff, Primary & Community Health Care staff, Residential/nursing home staff, pharmacists, dentists and so on).

Community based mobilization to ensure success of Targeted Screening.

Register and regular follow-up of people with IGT and pregnancy induced diabetes.

#### **STANDARD 4: Empowering people with diabetes**

Aim:- Educate people with diabetes so that they can participate fully in the management of their diabetes.

Intervention required include:-

- Structured education of people with diabetes in all aspects of diabetes care by multi-disciplinary teams
- Development of personal care plans
- Patient user friendly health records

#### Implications for service planning

- Develop programmes for patient education on diabetes.
- Train diabetes specialist nurses to provide group education and training.
- Develop community-based support.
- Provide support to patients through 24-hour diabetes call centre service.
- Education through internet.
- School education curriculum to include basic diabetes care.
- Expert patient programmes.

## STANDARD 5: Clinical care of adults with Type 2 diabetes

Aim: - Review of clinical management of people with diabetes to prevent or delay onset of complications.

Key Interventions required include:

- Use of appropriate measure of glycaemic control.  
{Use of glycosylated haemoglobin [ HbA1c ] as well as self monitoring of glucose}

- Improve glycaemic control.

(Vulgarise the use of blood glucose meters)

- Smoking cessation.

(Introduction of smoking cessation clinics.)

- Appropriate Blood Pressure management.
- Appropriate lipid profile management.
- Update local guidelines for management of diabetes.
- Weight management clinics.
- Use of protocols and introduction of Medical Auditing.

### Implications for Service Planning

- Train patients in the use of blood glucose meters.
- Provide facility for HbA1c measurements. ( IFCC aligned – aligned with International Federation of Clinical Chemistry).Ensure that all laboratories involved in HbA1c measurements are using appropriate analytical methods and are participating in quality control.
- Train personnel for smoking cessation clinics.
- Train personnel in adopting protocols of treatment.
- Train personnel in medical auditing.
- Provide facility for measurement of complete lipid profile (LDL/HDL cholesterol & triglycerides)..
- Identification and follow up of non-attendees.
- Provision of care and support to people with diabetes who are in residential or

custodian care.

- Ensure that all health care professionals involved in diabetes care receive continuing training to ensure up to date diabetes care.
- Establish clear referral pathways for diagnosed diabetic patients.
- Provision of access to latest literature on diabetes care (Diabetes Care journals, Diabetic Medicine, Diabetes Voice (IDF) etc) to staff involved in diabetes care.
- Provision for attendance to conferences on diabetes to medical and paramedical staff involved in diabetes care.
- Support for people on insulin – community-based programs for starting and monitoring insulin therapy.

### **STANDARD 6: Clinical care of young people with Type 2 diabetes**

Aim :- Recognise the specific needs of people and treat optimally young people with Type 2 diabetes.

Key Interventions include:-

- Interventions similar to those as outlined for children and people with Type 1 diabetes.

Implications for Service Planning: Similar as to that for children and people with Type 1 diabetes.

### **STANDARD 7: Clinical care of people with Type 1 diabetes**

Aim :- To provide care and support to children and people with Type 1 diabetes in such a way that they are able to live a better life.

Key Interventions include:-

- Education of school staff to deal with diabetes.

- Small group interventions including Diabetes camps to address practical diabetes management among children with diabetes and their parents and young people with diabetes.
- Provision of pen sets for insulin therapy to children with Type 1 diabetes to encourage better compliance.

#### Implications for Service Planning

- Will be similar to those of the clinical care of people with Type 2 diabetes but additionally will include
- Provision of support for children with diabetes at schools, care homes, nurseries, day care centres.
- Psychological support for children & young people with diabetes.
- Training and setting up of paediatric diabetes team.
- Community paediatric diabetes support teams.
- Close liaison between paediatric and adult diabetes team when transfer of care occurs.

### **STANDARD 8: Management of diabetic emergencies**

Aim:-To provide up-to-date, evidence-based medical care to people with diabetes presenting as emergencies.

Key Interventions will include:

- Setting up agreed care protocols for management of emergencies in people with diabetes with regards to:-
  - Hypoglycaemia.
  - Diabetic Ketoacidosis.
  - Hyperosmolar diabetic coma.
  - Medical and surgical emergencies in people with diabetes.

#### Implications for Service Planning

- Provision of education to people with diabetes, their families, people at worksites for the recognition and initial management of the common emergencies in people with diabetes.
- Training of health care professionals in acute clinical management of diabetes.
- Implement and audit protocols of acute clinical management in diabetes emergencies.

### **STANDARD 9: Care of people with diabetes during hospital admission**

Aim:- To provide commitment, care and support to people with diabetes when admitted in hospitals.

Key Interventions will include:

- Establishing a multi-disciplinary Diabetes Team, consisting of physicians, diabetes specialists nurses, nutritionists, psychologists and podiatrists in each regional hospital to be responsible for ensuring care according to standard protocols.

#### Implications for Service Planning

- Setting up of diabetes care teams consisting of a physician with interest in diabetes, a medical officer dedicated to diabetes care, a diabetes specialist nurse, a community diabetes nurse, a nutritionist, a podiatrist, a clinical psychologist in each Regional Hospital
- Training of diabetes specialist nurses who will be focal persons for people with diabetes during admission in hospitals and who will form a network with Community nurses.
- Training of community-based diabetes nurses to provide support in the community for diabetes care in specific cases.
- Training of staff in podiatry.

- Recruitment of clinical psychologists.
- Provision of healthier food and snack choices at Hospitals.

### **STANDARD 10: Diabetes and pregnancy**

Aim :-Women with pregnancy induced diabetes and with pre-existing diabetes have special needs. These women will be given care and support required to minimise risks secondary to diabetes during their pregnancy.

Key Interventions will include:

- Tight blood glucose control before and during pregnancy in order to reduce congenital malformation rates and perinatal mortality rates.

#### **Implications for Service Planning**

- Family planning advice to be incorporated in routine care of all diabetic women of child bearing potential.
- Women with diabetes who wish to become pregnant will be followed up in hospital outpatient to optimise their diabetes management before pregnancy. Once pregnant they would be followed up in Specialised Pregnancy / Diabetes Clinics.
- Provision of blood glucose meters and strips and training for use of blood glucose meters during pregnancy .
- Women to be advised and trained to monitor blood glucose regularly and how to adjust their insulin dosage (24 hr – Hotline to be provided for the purpose).
- Birth plan.
- Monitoring of blood glucose during labour to avoid neonatal hypoglycaemia.
- Dietary and lifestyle advice and close monitoring for women with abnormal glucose tolerance during pregnancy .
- Advice regarding contraception and future pregnancies.
- Capacity building for medical and paramedical staff to manage

people with diabetes during pregnancy.

- Community-based support in selected cases.
- Follow up of cases of pregnancy induced diabetes

### **STANDARD 11: Effective surveillance of complications**

Aim: Minimize impact of long-term complications by effective surveillance to ensure their early detection and appropriate intervention.

Key Interventions will include:-

- Surveillance of diabetes retinopathy by using digital retinal imaging by retinal cameras.
- Measurement of micro-albuminuria or the albumin/creatinine ratio.
- Setting up of comprehensive foot care service with:
  - Implementation of foot care protocols.
  - training of nurses in essential elements of foot care and prevention
  - Use of monofilaments and neurothesiometers.
  - Ankle Brachial Pressure Index measurements.
  - Support with podiatrists and orthotists.

Implications for service planning:

- Procurement of retinal cameras and training of personnel for a retinal screening service.
- Training of graders of diabetic retinopathy
- Training of officers in foot care.
- Training of orthotrists in diabetes foot care.
- Training of physicians in diabetes foot care.
- Providing monofilaments, handheld Dopplers and neurothesiometers.
- Training for the recognition of depression among people with diabetes.

## **STANDARD 12: Management of long term complications**

Aim: Establishment of evidence-based, protocol-driven effective management of long-term complications in order to reduce risk of disability

Key Intervention will include:-

- Clear referral pathways for people with diabetes complications.

### Implications for Service Planning

- Training of surgeons in re-vascularisation procedures.
- Training of orthopaedic surgeons in management of diabetes foot complications (e.g. Charcot's foot)
- Setting up of erectile dysfunction clinics.
- Training of health staff in management of sexual dysfunction.
- Reinforcement of ophthalmology services to support the retinal screening service.
- Training of podiatrists and orthotists to provide support in management of diabetic foot complications.
- Setting up of wound healing clinics.
- Training of paramedical staff in use of plaster casts for offloading in management of diabetic foot ulcers.

## **STANDARD 13: Multi-agency care**

Aim:- To ascertain coordinated care and support with close involvement of non governmental organisations.

Key Interventions will include:

- Regional diabetes team will ascertain coordinated care and support.
- Focal person ( Diabetes Specialist Nurse ) in each region to be responsible for coordination.
- Well established line of communication with private medical staff to be set up.

- Establish close links with non-governmental organizations involved in diabetes care.

**Implications for Service Planning**

- Review local provision of diabetes services
- Put systems in place to ensure coordinated care

**STANDARD 14: Research and Training**

**Aim:** - To make of Mauritius into an International Research and Training Centre for diabetes.

Key Interventions will include:-

- Improve existing networks to facilitate and coordinate research and training.
- Establishment of an International Advisory Board that will meet at least once a year in Mauritius composed of world-renowned diabetologists such as Prof. P. Zimmet, Prof. Sir George Alberti, Professor Pierre Lefebvre (Immediate Past President of IDF), Prof. J. Tuomehlito , Prof David Owens and Dr Mohan.
- Develop Memorandum of understandings and twinning with other international diabetes centres e.g. IDI, Finland, UK etc
- Setting up of pharmacovigilance.

**Implications for Service Planning**

- **Capacity building of medical and paramedical staff in research and training methodology.**
- **Modernisation of data capture and processing.**
- **Review of laboratory services to provide for laboratory investigations required in research setting.**

## Chapter 7

### THE WAY FORWARD

Various reports, including the MAB Report (1990), have identified weak and outdated managerial and technical structure at the Ministry of Health & Quality of Life, resulting in poor performance of the health services. The NCD office was constituted in 1988 with the idea of trying to overcome the administrative inertia by being semi-autonomous. Parts of the objectives were implemented successfully but again the NCD programme could not be sustained efficiently due to policy and administrative problems.

Appropriate structures will be set up to facilitate the implementation of the NSFD.

These will include:

- I** A small International Advisory Committee consisting of national and international experts will be set up to guide and give momentum to the programme. It may comprise of leading international diabetologists such as of Prof. Paul Zimmet, Prof. Sir George Alberti, Professor Pierre Lefebvre (Immediate Past President of IDF), Prof. Jaakko Tuomehlito, Prof David Owens and Dr Mohan (Chennai).
  
- II** Nationally, diabetes care would then be coordinated at a focal point by a Secretariat headed by a **Principal Medical Officer responsible for non communicable diseases** and supported by a physician with specific training in up- to-date diabetes management . The Secretariat will also consist of a community physician, the Chief nutritionist, a diabetes specialist nurse, the Principal HIEC officer, the Health Promotion Coordinator and administrative support .
  
- III** This Secretariat would link up internationally with other Centres of Excellence in diabetes and would eventually evolve into a Regional World Health

Organisation (WHO) Collaboration Centre for Diabetes – a Mauritian Diabetes and Heart Institute .

**IV** The setting up of regional core diabetes teams consisting of one physician in each region with specific interest in diabetes, one Community Physician, medical officers with specialized training in diabetes care, diabetes specialist nurses, nutritionists, health care personnel trained in podiatry, a Health Information Education Communication (HIEC) officer, a Community Health Development Motivator and a Community Diabetes nurse who would be responsible for dedicated diabetes care in the region .

**V** A National Service Framework for diabetes steering committee will be set up at the Ministry of Health and Quality of Life to steer the implementation of the framework ( Terms of reference of this Steering Committee are at Appendix A ) .

## Chapter 8

### COST OF DIABETES AND COST OF THE NATIONAL SERVICE FRAMEWORK FOR DIABETES

#### 8.1 Cost of diabetes

Diabetes is costly and in many countries it is the leading cause of blindness, kidney failure, heart disease and amputation of leg / foot. There are often huge human and economic costs, for it is a life-long disease, and it has a profound impact on every aspect of a person's life: physical, psychological and economic.

Life expectancy is reduced by more than 20 years in type 1 diabetics and up to 10 years in type 2 diabetics, most of them dying of coronary heart disease, and cerebrovascular accidents.

There are additional risks in pregnancy with increased chances of losing the baby, the baby being born with a congenital malformation or the baby dying at birth. The cost per person with diabetes in UK is about 802 pound sterling/year plus lost earnings, but once complications have developed the personal expenditure is increased three-fold.

In the United States, the healthcare and indirect cost of diabetes and its complications reached \$132 billion in 2002 (21 million American diabetics).

A study in China has estimated that for the urban population, the direct medical costs of diabetes are US\$ 451/year for someone without complications, rising to US\$ 1694/year for people with complications

In Australia costs are much higher at US\$ 3012/year for those free of complications. US\$ 5277/year for those with micro-vascular Complications. US\$ 6784/year for macro vascular complications and US\$ 7256/year for those with micro and macro complications.

In other words, it is highly cost-effective to invest in the prevention of diabetes and in the prevention of its complications.

## **8.2 Cost of diabetes in Mauritius**

Renal disease: there are about 783 patients on haemodialysis support who are looked after in 15 different centres, 5 public and 10 private. There is at the moment no patient on Chronic Ambulatory Peritoneal Dialysis (CAPD). Most (60-65%) of the patients on haemodialysis have end-stage renal failure as a result of diabetes. The cost of haemodialysis is about 85 million rupees per year. There is only one renal transplant unit and it is based at Jawaharlal Nehru hospital, Rose Belle where patients are transplanted from live related donors, and as many as 40 cases are done per year.

Diabetic eye disease: this service is based in only one centre in the public sector (S. Bharati Eye hospital at Moka) where laser treatment for 1000 cases per year, costing Rs. 5000-8000 per case, is performed. The major salvage surgery, vitrectomy, is still not performed routinely locally and about 500 patients are sent every year to Chennai, India since year 2000. The operation itself costs R 25,000 but amounts to R 40,000-50,000 when including displacement and travel. Some private patients travel to South Africa where the operation costs around R130,000-140,000.

Macrovascular disease: the complications from macrovascular disease are significant in the Mauritian population, most probably because of our Asian genetic background. Coronary Artery Bypass Grafts (CABGs) are now done at 2 different centres, one each in the public and private sectors. At the Cardiac Centre at Pamplemousses, 300-400 cases of coronary artery bypass graft surgeries are performed every year and 90% of them are diabetics. It costs approximately Rs 300,000 for each case. In the private centre, around 10-20 surgeries are done annually.

There are 3 centres where angiography is performed: 2 public centres: at the Cardiac Centre at Pamplemousses, 1200 cases done annually, and 1000 cases at the centre at Victoria Hospital.

The sequelae of peripheral vascular disease and diabetic neuropathy lead to lower limb amputations. Latest statistics reveal about 400 amputations per year. It costs on average about 50,000 to 100,000 rupees for each amputated limb depending on the duration of stay in hospital, and there is still no effective podiatrist service or any diabetic foot clinic locally.

The cost of diabetes in Mauritius is already having a significant impact on our health and social services and it will, if not dealt with properly now at all levels from

preventive measures to major policy changes, be even more costly and debilitating in the future.

### **8.3 Cost of the NSFD**

It is essential that we develop a National Strategy against Diabetes (NSFD) failing which we run the risk of our health system being overwhelmed by the costs of managing a larger number of people with diabetes and an increasing number of complications of diabetes by high-tech medicine.

## Appendix A.

The terms of reference of the Steering committee for implementation of the National Service Framework for diabetes will include:

- Finalise, as **A HIGH PRIORITY**, the structure which will be responsible for ensuring the successful implementation, monitoring and evaluation of the NSFD.
- Prioritise the implementation of recommendations over a 10-year period taking into account available capacity and resources.
- Identify possible funding agencies.
- Identify and involve local and international partner agencies for support of implementation.
- Review service models.
- Establish effective local and international links to enable capacity building, research and development.



Dr. A. Mohith Specialist Physician, Ministry of Health and Quality of Life.

Mr.S.Panchoo Senior Health Information Education and Communication Officer, Ministry of Health and Quality of Life.

Dr.P.Pugo-Gunsam Senior Lecturer, Faculty of Science, University of Mauritius.

Work on the NSFD has subsequently been completed by a committee at the Ministry of Health and Quality of Life.

Composition of Committee on NSFD at Ministry of Health and Quality of Life:

**Chairperson**

Dr.K.Pauvaday Principal Medical Officer for Primary Health Care, NCD and HIV / AIDS, Ministry of Health and Quality of Life.

**Members :**

Dr.U.Paratian Senior Adviser and Chairman of Steering Committee for Biomedical Research and Technological Innovation at Prime Minister's Office.

Dr.C.Sookram Regional Health Superintendent, Ministry of Health and Quality of Life.

Dr.A.Mohith Specialist Physician, Ministry of Health and Quality of Life.

Mr.S.Panchoo Senior Health Information, Education and Communication officer, Ministry of Health and Quality of Life.

Dr.P.Pugo-Gunsam Senior Lecturer, Faculty of Science, University of Mauritius.

Dr.P Ak.Ahkion	Specialist Physician, Ministry of Health and Quality of Life.
Dr.P.Chitson	Formerly Consultant Physician, Head of NCD and Health Promotion Division , Ministry of Health and Quality of Life.
Mr. R. Bhugwant	Principal Assistant Secretary, Ministry of Health and Quality of Life.
Mr.Ramphul	Health Economist, Ministry of Health and Quality of Life.

## REFERENCES

- The National Service Framework for Diabetes document- Department of Health, United Kingdom.
- A Diabetes Strategy for Africa- An integrated Strategic Plan for Diabetes and Related Health Risks – 2006 – A joint initiative of IDF Africa and WHO-AFRO.
- Mauritius and Rodrigues Non Communicable Disease and Nutrition Survey Report 2004.
- International Diabetes Federation publications.



