Health Funding Authority Eight
Health Gain Priority Areas For Māori Health 1999/2000

REPORT TWO: DIABETES

Māori Health Operating Group
Health Funding Authority
MĀORI HEALTH GAIN

PRIORITY AREAS
1999/2000

Diabetes

A report prepared by:
Māori Health Operating Group
Health Funding Authority
In 1998 the Health Funding Authority designated eight priority areas for Māori health gain. These areas are:

- Asthma
- Diabetes
- Smoking
- Immunisation
- Injury
- Oral health
- Hearing
- Mental health

It was acknowledged that, although there are many issues for Māori health, these eight were identified as areas where Māori have high health need.

In order to identify how health gains can be achieved for each of these health gain priority areas, it is necessary to understand the health impact of each area, aetiology and Māori (risk factors), how Māori are utilising health services and what are the outcomes from those services. Areas where health gain can be achieved may become more obvious following this.

In June 1999, work on these projects commenced. The reports from this project were prepared by the Māori Health Operating Group of the Health Funding Authority. Due to time limitations, this work has had internal peer review only. Projects involved literature review and for some a limited data analysis. The aim was to provide a resource for those working in areas of policy, purchasing or health service provision. Given limitations in terms of time, projects are limited in scope to primarily background information. There is little analysis of existing Māori provider services and it is hoped that work more specifically addressing service issues be undertaken, complementary to this work.

This paper on diabetes constructs a picture of Māori and diabetes, discussing Māori health status and health service utilisation related to diabetes.
EXECUTIVE SUMMARY

Background Issues

Māori health is a priority area for health gain with Māori experiencing poor health and higher levels of mortality and morbidity for almost all health areas relative to non-Māori. Within Māori health, diabetes is a key health area contributing significantly to poor Māori health.

Diabetes, in particular Type 2 or Non-Insulin dependent diabetes (NIDDM) is a growing health problem nationally and internationally. Key issues contributing to the growing incidence and prevalence are the aging population and changing diets, levels of exercise and increased weight of some populations. There are high rates of diabetes not only in Māori but also in other indigenous populations.

Diabetes has multiple impacts on health and the full impact of diabetes of individuals and whānau is difficult to determine.

Strategies to achieve health gain for Māori and diabetes requires a range of interventions - from healthy public policy, health promotion and prevention to best practice in the treatment of diabetes and its complications.

Diabetes and Māori Health

Prevalence of diabetes

The prevalence of known diabetes in Māori adults over 15 years was 8.3% in the most recent New Zealand health survey. The prevalence of known and unknown diabetes in a working population of Māori aged over 40 was 9.1%. The prevalence of diabetes (known and undetected) in Māori adults is likely to range as high as 15-20%.

Risks for diabetes

Māori with family history of diabetes, who are overweight, who have a history of gestational diabetes, and who are older have an increased risk of diabetes.

Low socio-economic status is associated both with being overweight and with diabetes.

Māori and complications of diabetes

Māori are more likely to have complications of diabetes at presentation and more likely to experience other risk affecting the development or the course of complications. These include increased likelihood of being hypertensive, having urinary microalbuminuria\(^1\) increased risk of being overweight, increased rates of smoking. Thus prevention, identification and optimal management of the complications of diabetes are all key strategies in achieving health gain. In particular,

\(^1\) Protein in urine – an indicator of higher rates of complications and poorer outcome.
cessation of smoking in those with diabetes will likely contribute to health gain. Elimination of other factors associated with poor outcome, in particular smoking will also lead to health gains.

**Hospitalisation information**

Hospitalisation data indicating trends over time shows Māori have consistently higher rates of admission for diabetes when compared with non-Māori. In 1995/1996 Māori rates for all of the younger (40s to 60s) age-groups was significantly higher for Māori than non-Māori. More information is needed on patterns and reasons for admission.

**Mortality**

In 1996 age standardised Māori mortality from diabetes was over six times that for non-Māori. Mortality also occurred at younger age groups when compared with non-Māori. In particular, in the ages from 45-60, age-specific Māori mortality for diabetes ranged between 12-15 times that of non-Māori in the same age group. Māori deaths due to diabetes constitute 22% of all diabetes deaths.

**Māori and Health Services**

**Help-seeking for diabetes**

There is little specific information on patterns of help-seeking by Māori with diabetes.

**Access**

Research identifies a range of barriers to care for those with diabetes. Cost is a likely significant factor in ability to access services or treatment. The benefits of Māori provision of services are identified as important components of accessible services.

**Use of primary care**

There is little information on Māori use of primary care for diabetes. With regards to general research on Māori utilisation of primary care services, studies identify that Māori underutilise primary care relative to need.

**Key Issues for Health Gain**

The following are a list of broad general areas where analysis indicates that health gains may be achieved for Māori at risk from or with diabetes.

**Intervention at the level of broad determinants of health**

Māori continue to experience considerable disadvantage within New Zealand Society. Social and economic inequality is a strong determinant of health.

---

2 This disparity is likely related to direct and indirect impact of colonisation and ongoing structural barriers based on discriminatory practices and belief at a variety of levels (institutional to individual).
Health Promotion / Prevention

This area is closely linked to the broad determinants of health and thus any health promotion and prevention for diabetes must take into account the context of people's lives. It is difficult to advise on nutrition when a whānau cannot afford the appropriate food.

Key risk factors identified that are amenable to change are weight and exercise. Analysis of the use of population based weight, nutrition and exercise programmes in Māori or others has not been undertaken to inform this paper and will be important in determining whether such programmes will be beneficial for Māori. Again, the context within which such programmes and interventions are run is an essential component.

Early detection

The rationale for early detection of diabetes is based on the view that early and good glycaemic control leads to a better outcome. Early detection will only be effective if the necessary services are available to provide better outcomes. Thus early detection must be linked to services\(^3\) that are effective. Screening on a population basis is controversial however, for many Māori, who may not readily access primary care services, the issue of population based screening needs to be considered. This must be in association with those conditions identified as being required for good outcome.

Effective treatment

An important strategy will be to ensure that there is an identified best-practice of care for diabetes and that Māori receive this best-practice in diabetes care.

The development of best-practice guidelines for Māori will need to take into account the context of Māori lives, health beliefs and behaviour. It is likely that there may be differing benefits from, for instance, a general practice based service for Māori and non-Māori. Health gains are more likely if services are acceptable and accessible. The provision of guidelines are often not developed with knowledge of Māori health promotion, range and kaupapa of Māori services in mind. The development of Māori specific best practice guidelines may be one way of ensuring the specific needs of Māori are acknowledged.

Areas for enhanced effectiveness include:

- Enhanced help-seeking and access.
- Management of glucose control
- Prevention of complications
- Management of complications

\(^3\) Services here includes the full range of services for those at risk from or who are suffering from diabetes and include dietitian, nutrition, podiatry, general practice, diabetes education, nurse specialist, specialist services, eye screening etc.
Recommendations

1) It is recommended that diabetes continue to be considered a high priority for Māori health and by the Māori Health Group, the HFA and the Ministry of Health.

2) It is further recommended that many of the particular individual strategies outlined in the Ministry of Health report "Strategies for the Prevention and Control of Diabetes in New Zealand" be supported. However, there is a need for priorities for Māori to be determined based on Māori need. With regards to strategies outlined, intended for Māori, it is imperative that there is strong Māori analysis and participation in the development of purchasing strategies. These may be linked with the following recommendation for a specific Māori strategy.

3) It is recommended that there be a specific Māori diabetes strategy developed with the aim of achieving health gain for Māori with diabetes. This must take into account the context of Māori lives, Māori diabetes risk profile and health status of Māori, health beliefs, health behaviours and relevant cultural issues. Such a strategy would need to be linked with any national diabetes strategy however be specifically centered on Māori.

4) Māori specific information, resources and education on diabetes should be available. It is recommended that there be (if not already done) a stocktake of diabetes information that is relevant for Māori with identification of gaps and development of resources accordingly.

5) It is important that the level of mortality and morbidity due to diabetes can be monitored. Further, given that it is possible that there may be differential prescribing or differences in pick up rates of diabetes treatments occurring on the basis of ethnicity, it is recommended that accurate ethnicity identification be expected. This should occur on hospital and accident and emergency data bases, HBL data and primary care. Feedback to providers, including Māori providers providing services for those with diabetes about levels of hospitalisation for diabetes in their populations will be important for services to monitor own performance and make comparison.

6) Aligned with above, in order to determine whether health gain is being achieved for diabetes, it will be important to decide on particular indicators for gain and monitor these in association with interventions. Such indicators could include mortality, hospitalisation, presentation to Accident and Emergency and After hours medical centres and use of primary care. The use of NHl numbers in primary care and the collection of accurate ethnicity data will contribute to better ability to monitor in this way.

7) It is recommended that there be further information gathered around any differences in management of diabetes in Māori and non-Māori given the concern that Māori may receive differing treatment than non-Māori. It is important that Māori receive best practice in terms of care for diabetes and difficulties in achieving best practice (through service factors or factors associated with Māori with diabetes) be identified and addressed.

8) Primary care and secondary care services need to incorporate understanding of particular needs of those whānau who are at highest risk of not accessing or adhering to treatment due to factors such as mobility, poverty, lack of understanding etc.
9) The value of a community based approach to diabetes has been shown. It is recommended that the purchasing of services that take a similar approach be investigated as a viable option for delivery of services relating to diabetes for Māori.

Suggested specific strategies that may address areas of health gain for Māori are also described here.

In order to achieve health gains for diabetes a range of strategies and interventions should be considered under the following:

**Ensuring healthy and adequate kai through:**
- Ongoing support of initiatives decreasing the social and economic gap between Māori and non-Māori (broad determinants of health). Ensuring adequate food source for Māori whānau through broad public health approaches that decrease the impact of poverty, poor housing and transport on food security and access to appropriate food.
- Improved access to present mainstream and Māori nutrition programmes; addition of new programmes to meet gaps; potential for specifically targeted diabetes prevention to those most at risk.
- Promotion of health and wellbeing with particular focus on nutrition, exercise and mental health (motivation) as part of broader health gain strategies.

**Early detection of diabetes** through a planned approach to screening those most at risk. It is recommended that a specific project be undertaken to consider the benefits/risks of a well planned and executed “population-based screening of Māori and other groups at high risk” be undertaken. Such a screening programme would need to be well planned and ensure that all criteria for screening are met (including provision of effective services) – early detection must be associated with strategies for better outcome. With regards to opportunistic screening, increased awareness of diabetes within the community, decreased barriers of access to primary care and increased awareness of the risk of Māori with regards to diabetes for health professionals are all potential strategies.

**Aim for excellence in glucose control** (clinical and self-management) through range of strategies including diabetes education, diet, exercise. Programmes need take into account context of peoples lives eg take into account cultural, economic circumstances, social and medical support. It is recommended that within a specific Māori strategy, guidance is given for how this could be achieved and what services need to be purchased.

**Enhanced primary care.** Given the evidence that Māori do not use primary care relative to need it is important to take into account the context of Māori lives when delivering services. This report recommends that the Māori Health Group investigate the development of services that work within this context (eg mobile nursing / health promotion / education / service co-ordination) in order to enhance primary care services for those with poor access. Given that there are similar issues in terms of access and utilisation for Māori with diabetes, chronic respiratory disease and heart disease, then a service that deals with a range of health issues may be most effective. Providing flexible services for whānau will likely be a successful approach for whānau with multiple needs.
The development of Māori specific best practice guidelines that are informed by what is known about successful health promotion and health service utilisation by Māori could be considered.

Community Development: This report supports community development approaches in health promotion and prevention of diabetes, and in meeting the needs of those with diabetes (eg Wairarapa Asthma Project). A recommendation is made that models of this kind of initiative be reviewed with Māori and diabetes in mind. The possibility of purchasing Māori community based initiatives that run along community development lines needs to be considered by the Māori Health Group in association with Public Health and Personal Health.

Smoking: There are strong links with smoking and diabetes (those with diabetes who smoke have a more poor outcome). Therefore it is recommended that strong support continue to go to decreasing the impact of smoking on Māori through decreased uptake and smoking cessation. Again this needs to take into account the context of Māori lives and the need for intervention not only with individuals and whānau but also with the broad determinants of health and wellbeing.

Interventions will need to be matched to settings for example for some a home based approach may be preferable to group based programmes and services whereas some will benefit from community based initiatives. Choices need to be made available when possible.
## CONTENTS

Preface ........................................................................................................................................ III

Executive Summary ............................................................................................................... IV

  Background Issues ........................................................................................................ iv
  Diabetes And Māori Health ........................................................................................ iv
  Māori And Health Services ........................................................................................... v
  Key Issues For Health Gain ............................................................................................ v

Contents .................................................................................................................................. X

List Of Figures ....................................................................................................................... XIII

List Of Tables ......................................................................................................................... XIV

SECTION ONE: INTRODUCTION AND BACKGROUND ...................................................... 1

1. Introduction ..................................................................................................................... 2

2. The Impact Of Diabetes ............................................................................................... 4

  2.1 International Impact ................................................................................................ 4
  2.2 New Zealand Impact ............................................................................................... 4

3. Diabetes And Health ..................................................................................................... 7

  3.1 The Health Effects Of Diabetes .............................................................................. 7
  3.2 Risk Factors For Diabetes ...................................................................................... 8
  3.3 How Does Diabetes Present? ................................................................................ 9
  3.4 Diagnosis Of Diabetes .......................................................................................... 9
  3.5 Screening ................................................................................................................ 10

4. Diabetes Strategy In New Zealand .............................................................................. 12

  4.1 NZ Strategies For The Prevention And Control Of Diabetes ............................... 12

5. Summary Of Health Effects ......................................................................................... 15

  5.1 Summary ................................................................................................................ 15
  5.2 Key Issues For Health Gain And Diabetes - General Issues ............................... 15

SECTION TWO: LITERATURE REVIEW: DIABETES AND MĀORI HEALTH ................... 16

6. Prevalence Of Diabetes In Māori ................................................................................. 17
6.1 Introduction ................................................................. 17
6.2 Findings Of National Health Survey ................................. 17
6.3 Discover Diabetes: Screening For Diabetes Mellitus In The Waikato ........................................ 18
6.4 Prevalence Of Known Diabetes In A Multiethnic Community ......................................................... 19
6.5 Prevalence Of Diabetes Mellitus And Impaired Glucose Tolerance In A New Zealand Workforce .......... 21

7. Māori And Risk Factors For Diabetes ................................. 23
7.1 Known Risk Factors For Developing Diabetes ................. 23
7.2 Levels Of Known Risk Factors For Developing Diabetes And Māori ................................................. 23
7.3 Risks For Complications ................................................. 25
7.4 Summary And Issues For Health Gain .............................. 28

8. Mortality And Morbidity Due To Diabetes .......................... 29
8.1 Data Issues Affecting Mortality Rates .............................. 29
8.2 Review Of Mortality Data 1996 ......................................... 29
8.3 Trends Over Time ............................................................ 30
8.4 Mortality Graphs ............................................................. 30
8.5 Morbidity Due To Diabetes .............................................. 39
8.6 Mortality And Morbidity For Diabetes ............................. 47

9. Māori Health Service Utilisation For Diabetes .................... 50
9.1 Introduction ................................................................. 50
9.2 Knowledge Of Diabetes .................................................. 52
9.3 Māori Attitudes To Diabetes And Services ....................... 54
9.4 Barriers To Care ............................................................ 55
9.5 Māori And Primary Care For Diabetes ............................ 56
9.6 Māori And Hospitalisation For Diabetes ......................... 58
9.7 Complications ............................................................. 60
9.8 Diabetes Interventions ..................................................... 61

10. Summary Of Māori And Diabetes ...................................... 62
10.1 Summary ................................................................. 62

SECTION THREE: MĀORI HEALTH GAIN AND DIABETES .......... 63

11. Māori And Health Gain For Diabetes ............................... 64
11.1 Issues ................................................................. 64
11.2 Risk Factors .............................................................. 65

12. Summary, Conclusions And Recommendations .................... 66
12.1 Summary ................................................................. 66
LIST OF FIGURES

FIGURE 1: Mortality (number of deaths) due to diabetes by population group 1996 ................................................................. 31

FIGURE 2: Diabetes deaths (numbers) by ethnicity and age group 1996 .......... 32

FIGURE 3: Mortality rates due to diabetes by population group 1996 .............. 33

FIGURE 4: Mortality rates due to diabetes 1996 ........................................... 34

FIGURE 5: Mortality rates for diabetes 1996 by age group and ethnicity ....... 35

FIGURE 6: Diabetes mortality rates by ethnicity and age group (35+) 1996 ....... 36

FIGURE 7: MĀORI rates of mortality for diabetes by gender and age group 1996 ................................................................................. 37

FIGURE 8: Mortality rates for diabetes by ethnicity and gender 1996 ............ 38

FIGURE 9: Hospitalisation due to diabetes by age-group - numbers of admissions. 1995/1996 ................................................................. 42

FIGURE 10: Hospitalisations due to diabetes by age-group - numbers of admissions 1996 ................................................................. 43

FIGURE 11: Diabetes hospitalisations 1995/1996 mean stay as inpatients ...... 44

FIGURE 12: Diabetes hospitalisation rates for the total population 1995/1996 by age-group and gender ......................................................... 45

FIGURE 13: Diabetes hospitalisation rates 1995/96 Māori and non-Māori by age-group ................................................................. 46

FIGURE 14: Diabetes hospitalisation rates by age-group, ethnicity and gender .... 1995/1996 ................................................................. 47

FIGURE 15: Māori rates of hospitalisation and mortality for diabetes 1995/1996 ... ................................................................. 50

LIST OF TABLES

TABLE 1: Aetiological Determinants and Risk Factors of Type 2 Diabetes .......... 8
TABLE 2: Prevalence of known diabetes in a multiethnic community.............. 20
SECTION ONE:

INTRODUCTION AND BACKGROUND
1. INTRODUCTION

This report is one of a series of reports on the Health Funding Authority’s eight Health Gain Priority Areas for Māori Health.

Each report is written in order to provide information about what is known about Māori Health in each of the health gain areas and identify areas for health gain.

The approach taken in each paper involves review and analysis of what is known about Māori health status and identification of Māori utilisation of health services.

This report summarises data from health surveys, research, reports, morbidity, mortality data and research identifying Māori health service utilisation in order to construct the picture of Māori and diabetes. It is beyond its scope to provide analysis of present initiatives or services for Māori with diabetes.

The aims of this report are to:
- Describe the picture of Māori health and diabetes; and
- Identify what are the health gain issues for Māori with regards to diabetes.

Specific objectives are to:
- Undertake a literature review of Māori prevalence of diabetes;
- Undertake a review outlining Māori risks of developing diabetes and particular issues related to these risks from a health gain perspective;
- Undertake a literature review of the health consequences of diabetes in Māori;
- Identify key areas for health gain with regards to diabetes;
- Describe links between diabetes and other health gain areas.

This report is intended for use as a resource by those working on policy, strategy or service provision related to Māori and diabetes. In particular this will be of use for the Māori Health Group of the Health Funding Authority, other Health Funding Authority Groups where relevant and the Ministry of Health. Public Health in their role with health promotion (nutrition and exercise) and Personal Health, in their role with primary care and with the treatment of diabetes related conditions and complications will have stakeholder interest in this material.

This paper is in three sections.
- The first section provides an overview of some of the broader issues associated with diabetes including international and NZ impact, a summary of the health effects of diabetes and risk factors for diabetes. This section is not specific to Māori, however aims to provide the base on which the Māori information is provided.
- The second section provides review of data and literature on Māori health status for diabetes, and mortality and morbidity and health service use for diabetes.
• The third section discusses key issues with regards to health gain for Māori and diabetes and provides summary, conclusion and recommendations.
2. THE IMPACT OF DIABETES

2.1 International Impact

Diabetes is a major global health problem. It causes substantial morbidity and mortality in the forms of cardiovascular, eye, kidney diseases, circulatory problems, skin infections and limb amputation. There is evidence that diabetes is increasing in many developing and newly industrialised nations and a doubling of the prevalence likely in the next 15 years (de Courten et al. 1999). There are important principles in the prevention and control of diabetes and its complications, however it is still unclear what are the most appropriate strategies to achieve desired outcomes.

In 1997 it was estimated that 123 million people probably had diabetes globally or about 2.1% of the world population. Most of this was Type 2 diabetes. It is estimated that by the year 2010 the total number of people with diabetes is projected to reach around 220 million worldwide. Asia will probably be home to 61% of the total globally projected number of people with diabetes (de Courten et al. 1999).

Paradoxically Type 2 diabetes has evolved as a major health problem because of increasing life expectancy. Over the past century improved nutrition and the control of communicable diseases has resulted in increased life expectancy. The benefits of improved life expectancy have unmasked age-related diseases such as Type 2 diabetes, cardiovascular disease, hypertension strokes and some cancers. These non-communicable diseases have replaced communicable diseases and are major contributors to ill-health and death. Type 2 diabetes has catapulted from a rare disease at the beginning of the century to its current position as a major global contributor to disability and death.

As well as this shifting pattern of disease, lifestyle changes contribute to the problem. Socioeconomic development over the last 40 to 50 years has led to a change in the way of life from traditional to modern. This is referred to in De Courten's paper as "Coca-Colonisation". Dietary changes and decreased physical activity combined with increasing length of life contribute to an epidemic of Type 2 diabetes.

2.2 New Zealand Impact

2.2.1 How Common Is Diabetes In New Zealand?

The Ministry of Health estimates that diabetes affects 2-5% of New Zealanders (Ministry of Health 1998).

A recent health survey undertaken by the Ministry of Health of New Zealanders (Ministry of Health 1999) found that 3.7% (that is one in 27) of the population over 15 had known diabetes. This equates to 104,446 people. It is further estimated that there may be this many people again who have diabetes however it is not detected.

\[4\] Findings of this survey with regards to ethnicity are discussed in the following section.
Other findings from this survey with regards to known diabetes in the general population\(^5\) were that:

- The prevalence of diabetes was greater in men than women (4.1% vs 3.3%).

- The prevalence increases with age with the survey showing 1.3% of 15-24 year olds, 2.1% of 25-44 year olds, 5.3% of 45-64 year olds, 6.5% of 65-74 year olds and 11.3% of 75+ year olds reporting being diabetic.

- There were differences in prevalence for income and deprivation where those with family incomes below $30,000 and those living in the most deprived areas having the highest rates. This is consistent with other research into diabetes in New Zealand (Scragg et al. 1991).

- There was also an increased prevalence in those with no qualifications vs those with school or post school qualifications although the difference was not as great as with income of deprivation.

### 2.2.2 What Are the Financial Costs of Diabetes in New Zealand?

The Ministry of Health (Ministry of Health 1998) divides the costs of diabetes into costs to the public sector and costs to the individuals with diabetes. These are in turn divided into direct and indirect costs.

The following points are made regarding cost in the Ministry of Health report (pages 53-57):

1. **Public sector direct costs**

   At least 5% of the costs of inpatient hospital care in New Zealand is attributable to diabetes and its complications.

   Previous estimates of costs of inpatient care have varied in different studies from $56 million per year (1992 study) to 80-100 million (1988 study).

   Direct costs were calculated by the Ministry of Health, based on calculations from 1994–1996 from a variety of sources that the costs of diabetes and its complications as a direct cost to the New Zealand public health system ranged from $NZ 133 million per annum (conservative estimate) to $NZ 242 million per annum.

2. **Public sector indirect costs**

   Lost productivity due to diabetes is difficult to quantify with suggested costs likely similar to health care costs.

3. **Costs to individuals – direct costs**

   These include full and part charges for GPs, prescriptions, other consultations not funded and diabetes related equipment. The amount is related to a variety of factors including access to services, severity of illness, eligibility for assistance etc.

\(^5\) The findings reported here are adjusted rates for age and sex when adjustment is appropriate
4. **Individuals – indirect costs**

Costs due to loss of income are likely significant for many diabetics. Issues for carers and costs of support are also important. There are no good estimates of these costs in New Zealand.

Diabetes is thus an illness that has a major impact on many individual New Zealanders and their families. It has a significant impact on health services at all levels. Issues such as the aging New Zealand population, increasing poverty and decreasing food security, the increasing weight of New Zealanders and an increasing proportion of New Zealanders in populations most at risk ie Māori, Pacific and Asian populations make diabetes a growing health issue in New Zealand. It will be important that strategies aimed at achieving health gain in this area are able to address the broad picture of what contributes to high rates of diabetes alongside enhanced treatment and treatment outcomes for those with diabetes.
3. DIABETES AND HEALTH

There are two main forms of diabetes:
- Insulin Dependent Diabetes Mellitis (IDDM)
- Non-Insulin Dependent Diabetes Mellitis (NIDDM) or Type 2 diabetes.

This paper deals mainly with NIDDM or Type 2 diabetes and the term diabetes in this paper will be mainly referring to Type 2 diabetes.

3.1 The Health Effects of Diabetes

Diabetes mellitus is a group of disorders that are characterised by high levels of sugar (hyperglycemia). Not only is there a problem with how sugars are dealt with by the body but also with the metabolism of fat and protein. This is partly due to insufficient insulin. Many of the health effects of diabetes are associated with abnormal levels of sugars. Other health effects stem from the direct effects of balancing treatment with diet and living – imbalances can lead to serious health problems and fatality.

3.1.1 Natural History

Type 2 diabetes is a progressive disease associated with insulin resistance and a deterioration in the functioning of the pancreatic beta-cells. Pancreatic dysfunction and insulin resistance likely coexist to create a condition that is both insidious in its onset and variable in its impact and in its presentation.

3.1.2 Consequences and Complications

If untreated, diabetes may lead to characteristic clinical symptoms, which vary in severity. Potentially untreated diabetes may lead to emergencies such as diabetic ketoacidosis (i.e. a metabolic state related to too much circulating sugar).

Diabetes is not usually fully reversible and must be managed and controlled in order to enable those with diabetes to have a normal lifestyle and to minimise the effects of long term complications.

Long term complications of diabetes can significantly decrease life expectancy.

These complications include:
- Disease of the big arteries (macrovascular disease): This is associated with increased prevalence of coronary artery disease and peripheral vascular disease. Problems in lower limb circulation may disrupt healing of injuries or sores. Those with diabetes are particularly prone to leg ulcers, foot sores and amputations.

- Disease of the small arteries (microvascular disease): This leads to damage to the eyes (retinopathy) and the kidneys (diabetic nephropathy).

Other health effects and associations have been noted in the mental health literature identified that between 15-20% of those with diabetes may also be depressed and that those with both diabetes and depression have a worse outcome for both

Thus those people with diabetes require management of glucose control not only to maintain health on a daily basis, but also to prevent the progression of serious complications.

3.2 Risk Factors for Diabetes

3.2.1 Risk Factors

Social, behavioural and environmental risk determinants unmask the effects of susceptibility to Type 2 diabetes with the result that it now occurs in high proportions in many populations.

Risk factors are those characteristics that are associated with disease. They may not necessarily be causal however can be modified through intervention. Other characteristics such as age, gender and ethnicity are determinants of disease occurrence and are not modifiable.

Table 1: Aetiological Determinants and Risk Factors of Type 2 Diabetes

- Genetic factors
  - Genetic markers
  - Family history
  - 'Thrifty gene's', etc.
- Demographic characteristics
  - Sex
  - Age
  - Ethnicity
- Behavioural and lifestyle-risk factors
  - Obesity (including distribution of obesity and duration)
  - Physical inactivity
  - Diet
  - Stress
  - 'Westernisation, urbanisation, modernisation'
- Metabolic determinants and intermediate risk categories of type 2 diabetes
  - Impaired glucose tolerance
  - Insulin resistance
  - Pregnancy-related determinants (parity, gestational diabetes, diabetes in offspring of women with diabetes during pregnancy, intrauterine malnutrition or overnutrition)

From (Levy 1999)

3.2.2 Familial Factors

Type 2 diabetes is a familial disease that is likely in part genetically determined (Levy 1999). The lifetime risk of a first degree relative of someone with type 2 diabetes is estimated at about 35% with the relative risk of diabetes compared with the general population, of between three and fourfold. The nature of this genetic contribution is unclear and it is likely that several genes may confer diabetes susceptibility.
3.2.3 Environmental Factors

Changes in diet and physical activity have a marked impact on the development of diabetes. Those particularly at risk are those who are overweight, those who have little exercise and those where weight is centrally distributed. The impact of these factors interacts with likely familial determinants.

Low birthweight has been associated with the later development of type 2 diabetes (Levy 1999). This is not thought to be the major contributor however to the development of diabetes.

3.3 How Does Diabetes Present?

3.3.1 Acute and Non-Acute Presentation

There is a classic triad of symptoms warning of the presence of diabetes

- Urinating a lot (polyuria)
- Thirst
- Weight loss – due to fluid loss and breakdown of fat and muscle.

Other symptoms include:

- Lack of energy
- Blurred vision
- Itchiness
- Increased infections

Diabetes may also present with complications:

- Skin infection
- Retinopathy found while visiting an optician
- Neuropathy causing numbness and tingling
- Impotence
- Arterial disease
- Kidney disease

Diabetes may not have any symptoms ie is asymptomatic

- May present with raised blood glucose on routine examination.

It is important for those at risk and people in general to be aware of symptoms of diabetes. Early detection may avoid progression of complications. Of concern, as the onset is often insidious, the development of symptoms may not be noticed until serious health effects result. The value of opportunistic screening for diabetes in those at risk who present for health reasons to primary care has been one method suggested to identify diabetes in those who may otherwise be unaware of its development.

3.4 Diagnosis of Diabetes

There have been a variety of groups who have worked on classification of diabetes including the National Diabetes Data Group of the National Institutes of Health in the USA, and the World Health Organisation Expert Committee on Diabetes. This definition included identification also of Impaired Glucose Tolerance (IGT). This is a zone of diagnostic uncertainty in Oral Glucose Tolerance Test (OGTT) between
where normal glucose tolerance and diabetes occurred. Many with Impaired Glucose Tolerance (IGT) subsequently develop overt diabetes.

With regards to recent classifications, the WHO identifies a diagnostic point of 11.1 mmol per litre for two-hour post glucose concentration as being diagnostic of diabetes.

It is noted that the prevalence of micro-vascular complications are increased at around 11.1 mmol per litre (Levy 1999). With regards to Fasting Plasma Glucose (FPG) the criterion of 7.8 mmol per litre or 140 milligrams per decilitre, represents a greater degree of hyperglycaemia than a two hour criteria of 11.1 mmol per litre.

Whilst oral glucose tolerance testing as a form of screening is seen to be debated due to complexity of diagnostic criteria and test re-test variability, it is able to identify high risk subjects ie those with impaired glucose tolerance.

### 3.5 Screening

The rationale for screening is outlined by de Courten (1999) who states:

"earlier detection of diabetes through screening might provide an important opportunity to reduce the progression of micro-vascular or macro-vascular disease caused by asymptomatic hyperglycaemia. Numerous epidemiological studies in some animal models suggest that the degree of hyperglycaemia and the duration of disease are closely associated with micro-vascular (retinopathy and nephropathy) and neuropathic complications of diabetes and many newly identified cases of Type 2 diabetes have several other cardiovascular disease risk factors in evidence." (de Courten et al. 1999)

Thus, it is highlighted that there is higher risk of complications the longer that hyperglycemia goes unmanaged.

Whether identification of diabetes leads to health gain has been found to relate to the kinds of support and services available and the context of people's lives. Of most importance it is stated that detection of Type 2 diabetes in asymptomatic adults is unlikely to provide optimal benefit unless:

"it is accompanied by a comprehensive health assessment, during which other lifestyle related conditions requiring treatment may also be detected. Screening asymptomatic people may also have some harmful effects, including false positive diagnoses."

They also note that there is no definitive evidence that detection of Type 2 diabetes in the asymptomatic period can significantly improve long term health outcomes or that it is cost beneficial. They state:

"targeting screening to high risk groups, so-called opportunistic screening, such as certain ethnic groups, older and overweight subjects or people with previous gestational diabetes or other CVD risk factors, and emphasising interventions that are inexpensive and safe (exercise, prudent diet and weight loss) are likely to minimise potential adverse effects of screening."
They note the risk factor profile of age, ethnicity and body mass index or other factors at which opportunistic screening will be recommended may vary across populations. For this reason, any discussions about screening and screening programmes must acknowledge population differences in the determination of priorities for screening, who and how to screen alongside in the analysis of what services and programmes will be required in order to confer some health benefit to the screening process.¹

Much of the debate about whether or not to screen for diabetes relates to the issue of whether knowing that someone is diabetic, makes a difference to outcome. De Courten’s discussion above supports the benefits of screening in the presence of adequate and effective interventions.

From what is known about Māori health, Māori health service utilisation and health promotion, it follows that there must be careful consideration of how able are services to effectively meet the particular needs of Māori. This report strongly emphasises the need for Māori to have a choice of services that are likely to be acceptable, accessible and effective for Māori. For some, there will be a preference for Māori specific services, for others this may not be an option or a choice. Mainstream services must also ensure that services provided are able to understand and meet the particular needs of Māori.

¹ Appended to this document is a report about issues related to the proposed “clip-on” of diabetes screening to the Hepatitis B screening campaign.
4. DIABETES STRATEGY IN NEW ZEALAND

4.1 NZ Strategies for Diabetes

4.1.1 Background

In 1997 the Public Health Group of the Ministry of Health released a report entitled "Strategies for the Prevention and Control of Diabetes in New Zealand" (Public Health Group Ministry of Health 1997). This report was the result of extensive consultation on a discussion paper Issues Around a National Plan of Action for Diabetes and submissions to it. The report aimed to provide direction for the reduction of risk of New Zealanders developing diabetes and its complications. This was described in the report as urgent due to the increase in diabetes prevalence and incidence. They state:

"Diabetes is a priority issue which, unless urgently addressed, will place increasing burdens on health services and society, especially Māori and Pacific people." (Public Health Group Ministry of Health 1997).

In this report they further state that the vision for Strategies for Diabetes is to:

"achieve environmental change through both intrasectoral collaboration and intersectoral collaboration to help individuals make the life-style changes needed to prevent non-insulin dependent diabetes mellitus (NIDDM) and other non-communicable diseases. It recognises that such lifestyle changes can only be achieved with a supportive environment. This means that there must be community driven and owned taking into account both ethnic and individual needs with special consideration for those in rural areas."

4.1.2 Relevant goals

The Strategies for Diabetes were based on some of the goals that had been set previously by the Ministry of Health. The relevant goals were identified as:

- To improve, promote and protect Māori health status so in the future Māori will have the opportunity to enjoy at least the same level of health as non-Māori
- To improve, promote and protect the health of Pacific people
- To improve, promote and protect the health of older people/kaumatua
- To ensure a social and physical environment which improves, promotes and protects public health and whānau public health.
4.1.3 The New Zealand Declaration

This is described in the Ministry of Health report. It is based on the St Vincent Declaration\(^7\). The NZ Declaration was presented to the NZ Government in 1994 and is endorsed in the Ministry of Health report being discussed here (Public Health Group Ministry of Health 1997). The following five year targets were identified in the declaration.

- To reduce new blindness due to diabetes by one-third or more
- To reduce numbers of people entering end-stage diabetic renal failure by at least one-third
- To reduce by one-half the rate of limb amputations for diabetic gangrene
- To cut morbidity and mortality from coronary heart disease in people with diabetes by vigorous programmes of risk factor reduction
- To achieve pregnancy outcome in the woman with diabetes that approximates that of the non-diabetic woman.

4.1.4 Progress on Health Outcome Targets

This report outlines targets set and monitored by the Ministry of Health in their Progress on Health Outcome Targets documents. In 1997 the targets were:

- To reduce the annual age-standardised mortality rate from diabetes among the total New Zealand population to eight per 100,000 or less by the year 2002
- To reduce the annual age-standardised mortality rate from diabetes among Māori to thirty per 100,000 or less by the year 2002.

4.1.5 Primary Prevention

The report states that “Primary prevention (ie, prevention before any evidence of disease is present) of NIDDM is the ideal method for controlling the diabetes epidemic. Primary prevention involves removing or reducing the causes of disease, particularly obesity and low physical activity levels. Preventive efforts may be directed at the entire population or targeted at those at increased risk.

4.1.6 Screening

With regards to screening for NIDDM, this report describes two potential options, opportunistic screening of at-risk individuals or population based screening. The authors state that there is little support for population based screening and that opportunistic screening but can only be justified as part of a lifestyle intervention programme reducing risk factors whether they screen positive or not.

4.1.7 Key Strategies

The report outlined several strategies across primary prevention / health promotion, screening to detect disease and diabetes care to prevent complications. Strategies

---

\(^7\) This "Declaration" is an international declaration identifying targets for diabetes.
under this heading were divided into those related to education / empowerment, coordination of care, improved monitoring, special clinical recommendations and recognition of international initiatives for diabetes care.

The specific strategies will be discussed further in section 3.
5. SUMMARY OF HEALTH EFFECTS AND KEY ISSUES FOR HEALTH GAIN

5.1 Summary

Type 2 diabetes affects adults and older people with the age of onset being related to a range of factors including presence of familial predisposition, change in body weight and body size. Health affects are many and include both physical and mental health effects. Mortality in those with diabetes is premature.

Due to the natural history of Type 2 diabetes the onset is insidious thus complications may be developing or have developed before diabetes is diagnosed. Research shows that optimal sugar control decreases the progression of diabetes and poor glucose control is associated with more severe complication.

5.2 Key Issues for Health Gain and Diabetes - General Issues

This introductory and background section has raised the following issues with regards to health gain for diabetes:

- Diabetes has considerable health impact and is likely to grow in its health impact on populations throughout the world and in New Zealand.
- Diabetes is costly and debilitating.
- Diabetes affects different populations differently and issues for health gain must be developed with these differences in mind.

Areas for health gain will include a range of areas from promotion of well being, prevention through decreasing risks, early detection of diabetes, optimal management of diabetes including optimal glucose control and early detection and management of complications.

There is some debate within the literature over what constitutes a "diagnosis" of diabetes, the importance of impaired glucose tolerance and how to undertake screening. Any strategies for health gain will need to take these debates into account and make decisions based on analysis of the range of available information. It is likely that a range of expertise will be required in order to undertake this kind of analysis.
SECTION TWO:

LITERATURE REVIEW: DIABETES AND MĀORI HEALTH – PREVALENCE, MORTALITY AND MORBIDITY
6. PREVALENCE OF DIABETES IN MĀORI

6.1 Introduction

This section provides a summary of the findings from the literature review into the prevalence of diabetes in Māori. There have been several studies and surveys that have investigated the prevalence of diabetes in Māori.

Of the few studies undertaken in New Zealand, the majority have investigated or surveyed rates of known diabetes ie estimated the number of people with diabetes that has already been diagnosed (Ministry of Health 1999; Simmons 1996a; Simmons 1996b; Simmons et al. 1994; Simmons et al. 1999a). Other studies have investigated the prevalence of a combination of known and newly detected diabetes in a working population (Scragg et al. 1991) or in a small community sample (Lawrenson et al. 1993).

There are thus no major population based community studies that have investigated the prevalence of diabetes (both known and unknown) in a community sample of the New Zealand adult population. Estimates of prevalence are therefore based mainly on surveys and research into levels of known diabetes with some estimates made on likely levels of unknown diabetes.

Hospitalisation for diabetes provides a useful indicator of the levels of morbidity and severity of diabetes within the community and of the health services being utilised. Diabetes hospitalisation cannot however be utilised as a proxy for prevalence of diabetes within a community as it is dependent on many factors that also affect the outcome of diabetes and patterns of utilisation of health services. In this paper, the patterns of admission for diabetes by age-group are utilised in order to identify which groups of Māori are requiring hospitalisation, what this may mean in terms of levels of morbidity and how this differs from non-Māori. With regards to complications, levels of hospitalisation for particular complications such as amputation and renal disease / dialysis may give some indication of the level of morbidity due to complications.

6.2 Findings of National Health Survey

The prevalence of diabetes in the 1996-97 health survey (Taking the Pulse, 1999) was identified as 3.7% of people aged 15 or over with diagnosed diabetes (Ministry of Health 1999). Approximately 350 of the adult respondents reported being diagnosed with diabetes.

Diabetes increased dramatically with age with those over 75 years or older having approximately one in nine diagnosed with diabetes. There were similar rates in men and women.

Of importance there were significant differences across ethnic groups in the rates of diabetes. Māori and Pacific people were found to be more than twice as likely as European people to be diagnosed with diabetes.
8.3% of Māori (aged over 15) compared with 3.1% of Europeans stated that they had been diagnosed with diabetes.

With regard to this difference the report states that differences in the rates of diabetes between ethnic groups may be in part due to “differences in rates of obesity and other lifestyle factors.” They also mention a likely genetic predisposition to diabetes.

With regards to self reported health status, people with diabetes were more likely than non diabetics to report that their health was only fair or poor and less likely to report good or excellent.

People with diabetes are more than twice as likely to have visited their GPs more in the last year. With regard to hospitalisations, nearly one third of people with diabetes had been admitted to hospital in the last year compared to one in six without diabetes.

The median age of diagnosis of diabetes was 50 years however the age at diagnosis varied. The median age for Europeans was 55.5 years compared with 43 years for Māori and 47 year for Pacific.

6.3 Discover Diabetes: Screening For Diabetes Mellitus in the Waikato

(Lawrenson et al. 1993)

6.3.1 Study Method

Free screening for diabetes was offered to the populations of three rural North Island communities as part of an initiative to improve the detection and management of NIDDM. As part of this, an initial campaign to promote glucose testing as an important preventative health measure for at risk members of the community was undertaken through a variety of media and organisations. Those at risk were defined as Māori over 20 and European over 40 who were obese or had a family history of diabetes. Screening involved a random capillary glucose test followed by an oral glucose tolerance test for those with results ≥8mmol/L.

6.3.2 Study Findings

A total of 5589 people voluntarily attended screening.

For Māori in the 'at risk' age groups (20 years plus) resident in the three target areas, 972 out of a presumed 3600 (i.e. 27%) attended screening.

There was no difference in the proportion of Māori over 60 years who attended in comparison to the proportion Māori aged 20-59 years.

The pick up rate amongst Māori over 20 and non-Māori over 40 increased with age. No Māori aged 20-49 with a mean body index < 30 were found to have diabetes. In this age group diabetes was diagnosed in obese Māori only. Over the age of 50, the distribution of diabetes in the obese and non-obese was similar to that found in the non-Māori population.
Because of the low participation rate by Māori in this study, it is not possible to make a good estimate of the prevalence of diabetes within the population although some findings with regards to the usefulness of this screening programme and its methodology are discussed in the paper. The low participation by Māori was noted by the authors of this paper as an important issue for designing and implementing diabetes screening programmes.

6.4 Prevalence of Known Diabetes in a Multiethnic Community

(Simmons et al. 1994)

6.4.1 Summary

This study aimed to describe the prevalence of known diabetes in an area with large Pacific Island and Māori population ie South Auckland. The method used was a "door knocking" community survey of all residents.

Findings with regards to prevalence are outlined in Table 2. Of note it shows a high prevalence within Māori populations particularly in the 40-59 year age groups relative to European and in the greater than 60 year age group. Age specific prevalence of diabetes in one of the most socioeconomically under privileged areas of New Zealand was found in this study.

6.4.2 Key Findings

General findings

- This study found a high prevalence of known diabetes in South Auckland. Authors conclude that this is consistent with higher prevalence expected in more disadvantaged individuals.

- The associated costs from treatment, diabetic tissue damage and social costs are likely to be higher in Māori and Pacific people who appear to be a greater risk of diabetic tissue damage than European peoples.

- A missing 11.2% of diabetic patients on the GP registers indicates prevalence figures are greater than those shown.

Mobility

- The study population had a very high mobility. This has some obvious implications for both the ability to obtain complete information for this study as well as for the care of those with diabetes. High mobility contributes to an increased difficulty in providing continuity of care in the management of those with diabetes.

- In Otara 31.3% of those with diabetes on registers were no longer in residence at the follow-up period.

- A key issue posed is whether the prevalence of diabetes is the same as the mobile and immobile population. If not "surveys based on GP registers are likely to be less reliable than house to house surveys."
The authors estimate that they have likely underestimated the prevalence of diabetes.

**Underdiagnosis**

- The data presented suggests under diagnosis is a major problem "possibly because of community unawareness, the insidious nature of diabetes, and the variability of GP case protection in association with the current $6.00 charge for laboratory casual glucose estimation".

While improvement in the detection of diabetes in such communities is urgently required, these must be linked to the provision of ongoing advice on diabetes prevention and immediate access to quality diabetes education and monitoring.

**Table 2: Prevalence of known diabetes in a multiethnic community**

<table>
<thead>
<tr>
<th></th>
<th>European</th>
<th>Maori¹</th>
<th>Pacific Is²</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number</strong></td>
<td>1417</td>
<td>5606</td>
<td>14802</td>
</tr>
<tr>
<td><strong>% of total</strong></td>
<td>6.3%</td>
<td>24.7%</td>
<td>65.3%</td>
</tr>
<tr>
<td><strong>1991 census</strong></td>
<td>1500</td>
<td>5758</td>
<td>11169</td>
</tr>
<tr>
<td><strong>% enumerated</strong></td>
<td>94.5%</td>
<td>97.4%</td>
<td>132.5%</td>
</tr>
<tr>
<td><strong>Mean age (yrs)</strong></td>
<td>40</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td>(95 % CI)</td>
<td>39-41</td>
<td>24-25</td>
<td>23-24</td>
</tr>
<tr>
<td><strong>Mean no./house³</strong></td>
<td>2.6</td>
<td>4.1</td>
<td>5.0</td>
</tr>
<tr>
<td>(95 % CI)</td>
<td>2.5-2.7</td>
<td>4.0-4.3</td>
<td>5.0-5.1</td>
</tr>
</tbody>
</table>

**Known diabetes prevalence**

<table>
<thead>
<tr>
<th></th>
<th>European</th>
<th>Maori¹</th>
<th>Pacific Is²</th>
</tr>
</thead>
<tbody>
<tr>
<td>^&lt;20 yrs</td>
<td>1/271</td>
<td>3/2536</td>
<td>4/7100</td>
</tr>
<tr>
<td>%</td>
<td>0.4%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>20-39 yrs</td>
<td>3/385</td>
<td>29/1937</td>
<td>34/4854</td>
</tr>
<tr>
<td>%</td>
<td>0.8%</td>
<td>1.5%</td>
<td>0.7%</td>
</tr>
<tr>
<td>40-59 yrs</td>
<td>14/480</td>
<td>101/939</td>
<td>164/2276</td>
</tr>
<tr>
<td>%</td>
<td>2.9%</td>
<td>10.8%</td>
<td>7.2%</td>
</tr>
<tr>
<td>^≥ 60 yrs</td>
<td>26/281</td>
<td>32/194</td>
<td>59/572</td>
</tr>
<tr>
<td>%</td>
<td>9.3%</td>
<td>16.5%</td>
<td>10.1%</td>
</tr>
<tr>
<td><strong>Crude</strong></td>
<td>43/1146</td>
<td>162/3070</td>
<td>256/7702</td>
</tr>
<tr>
<td>(age ^≥20 years)</td>
<td>3.8%</td>
<td>5.3%</td>
<td>3.3%</td>
</tr>
<tr>
<td><strong>Age adjusted (20+)</strong></td>
<td>2.8%</td>
<td>6.9%</td>
<td>4.6%</td>
</tr>
<tr>
<td><strong>(95% CI)</strong></td>
<td>1.9-3.9%</td>
<td>6.0-7.9%</td>
<td>4.1-5.1%</td>
</tr>
<tr>
<td><strong>Odds ratio (95% CI)</strong></td>
<td>1.0</td>
<td>2.5(1.7-3.6)</td>
<td>1.6(1.1-2.3)</td>
</tr>
</tbody>
</table>

(From Simmons et al. 1996b)
6.5 Prevalence of Diabetes Mellitus and Impaired Glucose Tolerance in A New Zealand Workforce

(Scragg et al. 1991)

6.5.1 Key Points

This study was part of a 'multiracial workforce survey' on 40-64 year olds at worksites in Auckland and Tokoroa. Determining the prevalence of diabetes and impaired glucose tolerance was part of this study.

A workforce sample was chosen because of lower costs and recruitment compared to general population and ability to compare major ethnic groups.

People were categorized from their plasma glucose as having diabetes if levels were greater than 11.1 mmol per litre or impaired glucose tolerance if levels were between 7.8 to 11.1 mmol per litre. The Elley-Irving scale was used to determine socioeconomic status. Ethnicity was self-defined.

The study found that the prevalence of diabetes and impaired glucose tolerance were similar for men and women but increased with age. Gross annual household income was inversely associated with relative risk for diabetes and IGT. This was independent of age and ethnicity.

The relative risk of diabetes (when compared with European) was increased among Māori (3.63), Pacific Islanders (2.34) and Asians (5.97). This was after controlling for age, income and BMI.

6.5.2 Results in detail

(A) Demographic characteristics of study population.

There were 5677 participants. Of these:

- 70.6% were male.
- 30.5% were aged 40-44, 26.8% aged 45-49, 21.9% aged 50-54 and 20.9% aged 55-64.
- 7.7% were Māori, 11.7% Pacific Island, 1.8% Asian and 78.8% European.

(B) The prevalence of diabetes

- 81 of the 5677 were newly diagnosed diabetics, 106 had known diabetes and 162 with impaired glucose tolerance. The relative risks were similar between men and women.
- The prevalence of new and known diabetes was higher in Māori and Pacific people.
- The prevalence of diabetes increased with age. For all age groups, age standardised prevalence of new and known diabetes combined was 1.85% in Europeans, 9.91% in Māori, 8.87% in Pacific people and 7.54% in Asian. Variations by age and ethnicity were found for IGT prevalence also.
- The ratio of new to known diabetes cases decreased from 1.36 in the younger age group to 0.57 in the older age group.
There was no relation between the socioeconomic level and risk for diabetes or IGT, however when combined there was an inverse relationship with gross household income and age adjusted relative risks for each condition being higher in the lowest income group. Whilst ethnicity weakened this finding there was still an inverse association between income and the prevalence of diabetes mellitus and impaired glucose tolerance that was independent of age and ethnic group.

The risk of diabetes and IGT, adjusted for age and household income was 4 to 6 times higher in Māori, Pacific and Asian people.

Adjusting for BMI led to a decrease in the relative risks for Māori and Pacific people however differences were still significant. Risks for Asians increased.

Authors suggest that increased prevalence of diabetes and IGT in Polynesians is independent of income and BMI although the latter explains part of the increase.

### 6.5.3 Discussion

The authors of this paper state the prevalence in this sample was lower than that reported in a 1983 Christchurch Skellerup study. That study found 4.9% among European/Asians, 16.7% among Māori and Pacific people in staff aged 40-64. This compares with the age standardised prevalence rates in this study of 1.9% for European, 9.9% for Māori, 8.9% for Pacific people, 7.5% for Asians.

Given that there is an association between household income and prevalence of diabetes and IGT, then this sample likely underestimates the prevalence in the general population which includes a higher number of people on lower incomes.

Obesity is an important risk factor for NIDDM. This paper reports on prior work which suggests that increased diabetes prevalence in Polynesian people is primarily due to an increased level of obesity compared to Europeans. This is contrasted with work from Zimmet et al that suggests factors besides obesity, eg physical inactivity and diet, may cause increased diabetes among urbanised Polynesian people.

This paper finds a weakening in the relative risk of diabetes and IGT among Māori and Pacific people compared with Europeans when BMI was controlled for. Authors suggest that obesity is thus a major reason of the increased diabetes and IGT prevalence among 'Polynesian' people. They note however that relative risks remain significantly high after controlling for BMI. Therefore other factors are contributing.

They summarise:

"In summary, we have found an inverse association between household income and the prevalences of diabetes mellitus and IGT, which suggests that the prevalence in the general community is higher than in our more affluent working sample. Furthermore, the increased prevalence of diabetes mellitus and IGT, independent of obesity and household income, among Māori, Pacific Islanders and Asians compared with Europeans suggest that other factors must be contributing to their increased prevalences. We are investigating the possible roles of diet and physical inactivity in this data set."
7. MĀORI AND RISK FACTORS FOR DIABETES

7.1 Known Risk Factors for Developing Diabetes

Much has been written about risk factors for diabetes, and this report will only briefly cover risk factors as they apply to Māori.

Risks factors and aetiological factors have been discussed in Section One. A brief discussion on those of relevance are raised here.

For the purposes of this paper risk factors have been determined to be modifiable or unmodifiable. Those that are modifiable may be amenable to intervention in order to intervene at the "at risk" level.

Risk factors

Unmodifiable:
- Family history / Genetic Vulnerability
- Age

Modifiable:
- Weight / Nutrition
- Exercise

Other Modifiable Through Political / Social Intervention
- Low social and economic status

7.2 Levels of Known Risk Factors for Developing Diabetes and Māori

7.2.1 Family History / Genetics

There is much ongoing work investigating the role of genetics in the aetiology and outcome from diabetes. It is well recognised that those with a family history of diabetes are more susceptible. Given that Māori have high rates of diabetes then it follows that more Māori are likely to fall into the high risk category.

---

8 The issue of whether social and economic status is modifiable is dependent on the approach being undertaken. From a Public Health Perspective, the issue of supporting and advocating for healthy public policy is consistent with attempting to intervene at this level. The concept of Māori development and Māori health development would also support an approach that identifies that social and economic status requires intervention.
7.2.2 Age

Māori have a young age structure relative to non-Māori. Over time as the present young and middle aged Māori population reach older age groups it is likely that the number of Māori with diabetes will rise. Given the present high prevalence rate, this issue must be taken very seriously. If present rates of developing diabetes continue then this will create a large burden of disease on Māori through increased levels of morbidity and mortality due to diabetes. Health resources will need to rise accordingly. The issue of age thus raises the importance of health promotion, diabetes prevention now.

7.2.3 Weight / Nutrition

The recent national nutrition survey (ref) found that:
Māori males - 30% were overweight and 27% obese (Eu 41%, 12%)
Māori females - 32.7% overweight, 27.9% obese (Eu29.8, 16.7%)

This survey had many findings of relevance to understanding the nutritional status of Māori and non-Māori. It is beyond the scope of this report to discuss those finding in detail and readers are advised to read relevant sections of that report. One issue that is becoming more recognised in relation to nutrition, is that of food security. This concerns issues around how able people are to have access to appropriate nutritious food to meet requirements. The National Nutrition Survey identified that there were concerns about food security for some low income New Zealanders. A study looking at the impact of being poor on spending undertaken by social policy researchers also found that those on low incomes were less able to afford nutritious or health food (Waldegrave et al. 1999).

7.2.4 Exercise / Physical Activity

The National Health Survey (Ministry of Health, 1999) asked people about their levels and kinds of physical activity undertaken. Of note, Māori were as likely to fall into the physically active category as non-Māori however were more likely to be defined as sedentary. This indicates that many Māori are physically active however there are a group who get very little activity.

7.2.5 Social And Economic Status

There has been much written about inequalities between Māori and non-Māori in social and economic terms (National Health Committee 1988). A Te Puni Kōkiri report highlighted key gaps between Māori and non-Māori for various social and economic indicators. Māori experience increased levels of many of these factors relative to non-Māori. It appears that for many social, economic and health indices the gap between Māori and non-Māori has been rising. This is evident in the 1998 Te Puni Kōkiri report that identified the 'gap' between Māori and non-Māori. It outlined that for many indices, including income and unemployment, the gap between Māori and non-Māori had widened considerably over the past decades (Te Puni Kōkiri, 1998b).

With regards to income, employment, education and housing the following were key findings in this report:
- In 1997 the average yearly income of Māori households was around $10 000 lower than that of non-Māori. Just under half (48%) of Māori households earned less than $27 800 compared to 39.3% of non-Māori households.
• 36.3% of Māori were reliant on Government benefits as a main source of income compared to 14.3% of non-Māori.

• Māori home ownership rates are much lower than non-Māori with only 50% of Māori owning their own home compared with 72% of non-Māori and with Māori being twice as likely as non Māori to live in rented accommodation.

• Between 1986 and 1996 the proportion of Māori households who paid more than one quarter of their income in rent, doubled.

• Māori unemployment rose sharply in the 1980's with a widening gap between employment of Māori and non-Māori. With regards to long term unemployment, in Māori 1986 less than 1% of the Māori labour force had been unemployed for 26 weeks or more compared with 15.1% in Māori 1992. However non-Māori long term unemployment was 3.9% of the workforce at this time.

The overall picture indicates not only the declining circumstances for Māori over the past 15 years, particularly in relation to levels of employment, but also in terms of relativity with non-Māori.

Analysis of the New Zealand Census data shows about 20% of Māori households do not have access to a motor vehicle, and around 20% don’t have access to a phone.

Social and economic factors including related barriers to utilising health services are thus very important in considering how to improve morbidity and mortality due to diabetes in Māori. Understanding the context of Māori lives and how this impacts on access to health services is needed in planning strategies for achieving health gain for Māori with diabetes.

### 7.3 Risks for Complications

An important area for health gain related to diabetes, is complications. The following papers describe the levels of and significance of one risk for poor outcome from diabetes.

#### 7.3.1 Microalbuminuria in a Middle-Aged Workforce. Effect of hyperglycemia and ethnicity.

**Summary**

This study aimed to determine the prevalence of microalbuminuria in a working population and to determine the extent of ethnic variation. It also aimed to determine whether ethnic variation could be explained by abnormal glucose metabolism, obesity, hypertension, hypertriglyceridemia, and life-style factors.

5467 middle-aged Māori, Pacific Island and European workers participating in a health survey underwent urinary albumin concentration measurements. Participants underwent also a 75gm oral glucose tolerance test; weight, height and blood pressure measurements and completed a questionnaire about past medical history and sociodemographic status.
There was a higher prevalence of microalbuminuria in individuals with new cases of diabetes mellitus (24.1%), in cases of diabetes mellitus previously diagnosed (20.6%), and those with impaired glucose tolerance (16.1%) compared with nondiabetic individuals (4.0%). When various factors including gender, obesity, hypertension, etc were adjusted for, glycemia was the most significant determinant of urinary albumin concentrations in all three ethnic groups. Of note however, blood glucose concentrations did not completely explain the higher relative risk (95% confidence interval) of microalbuminuria in Māori (5.97; 4.48-7.78) and Pacific (5.33;4.13-6.87) workers compared with European workers. Authors speculate on the contribution of other factors such as diet and co-existing renal disease.

**Introduction**

An elevation of UAE (microalbuminuria) is common in diabetes and confers a higher risk of:

- Diabetic nephropathy
- CVD (cardiovascular disease) morbidity
- Early mortality
- Increased cardiovascular mortality
- Elevated BP
- Elevated blood lipids
- Cigarette smoking in diabetic individuals.

The associations between UAE and increased BMI, increased BP, hypertriglyceridemia, cigarette smoking, and heavy alcohol consumption.

Microalbuminuria is more prevalent in some ethnic groups. These are referred to within the study including 26% of Asian Indian NIDDM patients, 26% of men and 30% of women from the Pacific Island of Nauru and 13% of non-diabetic Mexican Americans.

In contrast the prevalence of microalbuminuria in diabetic and non-diabetic Europeans is usually 7-10 and 2-3% respectively.

The study aimed to determine to what extent the ethnic variation of UAE in a middle-aged workforce could be explained by abnormal glucose metabolism after taking into the account the effects of obesity, high BP, high glycerides, cigarette smoking and heavy alcohol consumption.

**Design and Methods**

In this study of workers and health screening surveys, participants were 40-78 year old aged workers from 46 companies. 7.7% were Māori, 11.7% Pacific Island, 78.8% European, 1.8% Asian.

This study is discussed in detail elsewhere and the methods will not be discussed further.

**Analytic Techniques**

Urinary albumin concentrations were determined in 5467 individuals using immunoturbimetric assay. Serum TG concentrations were measured on Chem 1 analyzer.
Diagnositic Criteria
Participants were assigned to:

- No albuminuria for men less than or equal to 28 mg/L, women less than or equal to 29 mg/L.
- Microalbuminuria – men 29-299 mg/L, women 30-299 mg/L.
- Clinical albuminuria – greater than or equal to 300 mg/L.

Diabetes and impaired glucose tolerance were diagnosed using WHO criteria for epidemiological surveys based on a two hour plasma glucose concentrations of greater than or equal to 11.1 and of 7.8 – 11.1 mM respectively. High diastolic blood pressure was diagnosed as greater than 76.8 mm of mercury.

Prevalences of microalbuminuria were:

- Non diabetics subjects = 4%; Impaired glucose intolerance = 16.1%; New diabetic cases = 24.1%; Diabetes cases previously diagnosed = 20.6%.
- Prevalence of albuminuria was 0.4, 0.7, 2.5 and 1% respectively.
- Ethnic differences in prevalence of microalbuminuria - After adjusting for age, mean concentrations of albuminuria were significantly higher in Māori and Pacific Island men compared with women and in Māori and Pacific Island workers compared with Europeans. This correlates well with the prevalence of microalbuminuria and clinical albuminuria which was considerably higher in Māori and Pacific Island workers when compared with Europeans.

Conclusions
After controlling for age, income and BMI, Māori and Pacific people are more likely to develop diabetes compared with Europeans. Māori have an increased risk of cardiovascular disease and microalbuminuria associated with an excess of known and potential risk factors such as increased weight, hypertension and hyperlipidemia. The authors thus suggest that this may be a potential reason why microalbuminuria is higher in Māori.

They suggest an alternative hypothesis that the increased prevalence of microalbuminuria in Māori and Pacific people may reflect environmental and lifestyle factors. They note there has been a demonstrated association between cigarette smoking and microalbuminuria and Māori men and women have heavier smoking habits than Europeans. Similarly the prevalence of hypertension is higher in Māori and Pacific Island people. These factors did not explain the increased prevalence of microalbuminuria found in the study.

A further explanation could be related to dietary habits. Māori were described as consuming diets in total energy protein and fat etc compared with Europeans. High protein intakes and high cholesterol intakes are associated with progressive renal insufficiency in experimental animals.

They state also that the prevalence of clinical albuminuria observed in the working population will underrepresent the level of the general population. They note that of patients attending a local diabetes clinic, 66% were currently not working.
7.4 Summary and Issues for Health Gain

Review of risk factors for developing diabetes and Māori shows that Māori have high levels of both modifiable and unmodifiable risks for developing diabetes. Modifiable risks related to weight, nutrition and exercise are potentially able to be modified with a variety of interventions and strategies. Given the relationship between diet, nutrition and "food poverty" then any strategy will need to take close account of the impact of low income or poor access to nutritious food.

A further key in addressing modifiable risk factors will be in ensuring that programmes etc are developed with cognisance of the context of Māori lives, Māori health beliefs and practices and what works and doesn't with regards to health promotion and Māori.

Māori also have increased risks of factors associated with worse outcome for diabetes. These are smoking (discussed elsewhere) and increased prevalence of urinary microalbuminuria (associated with poor outcome). The treatment for this is use of particular antihypertensive medication. Thus the early detection, appropriate treatment and the understanding of this as a risk in Māori is important as an area for improving health gain. The difference between Māori and non-Māori raises the issue of ‘guidelines’ and whether those assessing and managing those with diabetes need guidelines that are specific to Māori.
8. MORTALITY AND MORBIDITY DUE TO DIABETES

8.1 Data Issues Affecting Mortality Rates

There are important issues that need to be understood when undertaking analysis of mortality data due to diabetes. These include:

- The likely under recognition of diabetes as a contributor to mortality – data identifies diabetes as primary cause – may not identify diabetes as a secondary cause – under represents true contribution of diabetes to mortality.

- Likely under-reporting of Māori ethnicity on mortality data.

- Trends over time difficult as changing ethnicity recording on death certificates.

- Calculation of rates difficult over time due to changing denominator use from census.

The impact of these issues is that the numbers and rates of mortality likely under represent both overall levels of mortality contributed to by diabetes and underreport Māori mortality in general due to inaccuracy in ethnicity identification, particularly prior to September 1995. Rate calculations from 1996 onwards are difficult to compare with previous and likely to lead to under-estimation of true rates.

8.2 Review of Mortality Data 1996

With the above issues in mind, analysis of mortality data from 1996 was undertaken.

Key areas analysed included –

- Comparison with non-Māori for numbers of deaths, deaths by gender and by age.

- Overall age-standardised mortality rates were reviewed as were age-specific rates.

- Within Māori, numbers and rates were compared for Māori of differing age groups and gender.
8.3 Trends Over Time

(Scragg et al. 1991) reported that mortality from diabetes among non-Māori has declined by 34% in women and 18% in men during the 1970s up until 1985 but remained unchanged in Māori.

8.4 Mortality Graphs

The following graphs are presented in this section on mortality:

- Mortality (number of deaths) due to diabetes by population group 1996
- Diabetes Deaths (Numbers) 1996 by ethnicity and age group
- Mortality rates due to diabetes by population group 1996
- Mortality rates due to diabetes 1996
- Mortality rates for diabetes 1996 by age group and ethnicity
- Diabetes mortality rates by ethnicity and age group (35+) 1996
- Māori rates of mortality for diabetes by gender and age group
- Mortality rates for diabetes by age group, gender and ethnicity 1996

These graphs indicate that in 1996:

- Māori deaths attributed to diabetes makes up around 22% of all diabetes deaths.
- Māori male and female numbers of deaths are similar.
- Māori numbers of deaths peak in the ages between 50 and 65 while non-Māori numbers peak in the very elderly.
- Overall Māori mortality rates are 6.2 times that for non-Māori.
- In those in the 40s to 60s mortality rates in Māori are up to 12 times that for non-Māori.
- Māori mortality rates at 55 are similar to non-Māori rates at 80.
- Māori appear to die earlier than non-Māori.

Thus, not only is the prevalence of diabetes greater in Māori, Māori with diabetes tend to die younger. Some of excess mortality in younger age groups may be due to higher prevalence. When prevalence is taken into accounts there is still an excess of Māori mortality, particularly in the ages between 45 and 65.

This data must be viewed in light of caution raised on the previous page regarding data accuracy and it is the opinion of the authors of this paper that they likely under represent the true level of mortality in Māori due to poor ethnicity data recording.
Figure 1: Mortality (number of deaths) due to diabetes by population group 1996
Figure 2: Diabetes deaths (numbers) by ethnicity and age group 1996
Figure 3: Mortality rates due to diabetes by population group 1996

<table>
<thead>
<tr>
<th>Population group</th>
<th>Total</th>
<th>Total Male</th>
<th>Total Female</th>
<th>Maori total</th>
<th>Maori Male</th>
<th>Maori Female</th>
<th>Non-Maori total</th>
<th>Non-Maori Male</th>
<th>Non-Maori Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10.5</td>
<td>12.5</td>
<td>9.1</td>
<td>49.3</td>
<td>50.9</td>
<td>47.9</td>
<td>7.9</td>
<td>9.9</td>
<td>6.4</td>
</tr>
</tbody>
</table>
Figure 4: Mortality Rates Due to Diabetes 1996
Figure 5: Mortality Rates for Diabetes 1996 by Age Group and Ethnicity

- Maori
- Non-Maori

Death Rate per 100,000 (age specific)

Age Group

0-4
0-5
0-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
50-55
55-60
60-65
65-70
70-75
75-80
80-85
85+
Total
Figure 6: Diabetes Mortality Rates by Ethnicity and Age Group (35+) 1996
Figure 7: Maori Rates of Mortality for Diabetes by Gender and Age
Group 1996

MĀORI HEALTH OPERATING GROUP – HEALTH FUNDING AUTHORITY 37
Figure 8: Mortality Rates for Diabetes by Ethnicity and Gender 1996

<table>
<thead>
<tr>
<th>Age-group</th>
<th>Maori males</th>
<th>Maori females</th>
<th>Non-Maori males</th>
<th>Non-Maori females</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-</td>
<td>0</td>
<td>3.842</td>
<td>0.894</td>
<td>0.967</td>
</tr>
<tr>
<td>20-</td>
<td>0</td>
<td>4.384</td>
<td>0.815</td>
<td>0.776</td>
</tr>
<tr>
<td>25-</td>
<td>0</td>
<td>5.232</td>
<td>1.639</td>
<td>0.868</td>
</tr>
<tr>
<td>30-</td>
<td>0</td>
<td>6.919</td>
<td>3.576</td>
<td>1.826</td>
</tr>
<tr>
<td>35-</td>
<td>0</td>
<td>17.55</td>
<td>2.745</td>
<td>2.349</td>
</tr>
<tr>
<td>40-</td>
<td>0</td>
<td>60.89</td>
<td>11.7</td>
<td>10.99</td>
</tr>
<tr>
<td>45-</td>
<td>0</td>
<td>170.8</td>
<td>18.07</td>
<td>15.96</td>
</tr>
<tr>
<td>50-</td>
<td>0</td>
<td>230.7</td>
<td>22.42</td>
<td>45.35</td>
</tr>
<tr>
<td>55-</td>
<td>0</td>
<td>364.6</td>
<td>40.45</td>
<td>55.45</td>
</tr>
<tr>
<td>60-</td>
<td>0</td>
<td>420.3</td>
<td>86.4</td>
<td>73.87</td>
</tr>
<tr>
<td>65-</td>
<td>0</td>
<td>519.7</td>
<td>162.6</td>
<td>137.7</td>
</tr>
<tr>
<td>70-</td>
<td>0</td>
<td>219.3</td>
<td>185.6</td>
<td>194</td>
</tr>
<tr>
<td>75-</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80-</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85-</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8.5 Morbidity Due to Diabetes

8.5.1 Data Source

The following graphs are made up from data collected as part of routine data collection and compiled by the New Zealand Health Information Service (New Zealand Health Information Service 1997). Caution again must be taken when viewing these graphs as the data raises similar concerns as for mortality. In this case key issues are a key issue is the accuracy of ethnicity data collection and coding within hospitals. It has been shown is some research and analyses that there is Māori may be being underreported in data by around 30-50% (Reid and Robson 1998). There are also regional differences with hospital utilisation analysis indicating poorer ethnicity data recording in Southern areas (work in progress Māori health group, personal communication Ian Westbrooke).

8.5.2 Hospitalisation Graphs for Diabetes 1995/1996

The following graphs are presented in this report:

- Figures 9 and 10: Hospitalisations due to diabetes by age group – numbers of admissions 1995/1996
  These graphs show the same data and are presented differently to highlight differences in patterns of admissions by age. Non-Māori numbers of admissions peak at around 65 however stay relatively high for 10 years before dropping off. Māori numbers of admissions peak at 55 and drop off. This may reflect Māori mortality occurring at a younger age group.

- Figure 11: Diabetes hospitalisations 1995/96 Mean stay as inpatients
  This graph is taken from data that calculates mean length of stay. Main findings are that there are significant differences in length of stay between Māori and non-Māori with Māori women in particular having an average length of stay approximately 60% of non-Māori. It has been suggested that the likely cause for this is due differences in age between those admitted. Other potential factors may be that Māori are less likely to be managed in hospital when compared with non-Māori, being discharged or wishing to be discharged sooner. Given that Māori mortality is higher younger, then it is difficult to compare populations by age as Māori may experience the same level of illhealth at 55 that a 75 year old European experiences. There is insufficient information to determine this.

- Figure 12: Diabetes hospitalisation rates for the total population 1995/1996 by age group and gender
  This graph shows that there is a rise in hospitalisations for diabetes from age 45 onwards. Rates continue to rise from this age-group and peak at 75. Males have higher admission rates at all older age groups.

- Figure 13: Diabetes Hospitalisation Rates 1995/96 Māori and Non-Māori by age group
  This graph and accompanying data show the massive disproportion of admissions by Māori when compared with non-Māori for diabetes. This is particularly so in the ages between 40 and 60 when admission rates are between 5 and 6 times non-Māori. It is likely that some of this disparity can be put down to increase in prevalence of diabetes in younger age groups of Māori, however this increase in prevalence is not sufficient to explain all of the difference seen here.
There are a range of possibilities as to why this is. These include: that Māori have more severe diabetes, Māori have less well controlled diabetes, Māori are being treated in hospital when non-Māori are not, or there are a small group of high risk Māori having very high numbers of admissions. There is as yet insufficient information to determine which of these or what combinations of these explains this admission pattern.

Figure 14: Diabetes Hospitalisation Rates by Age group, ethnicity and gender 1995/1996
This graph shows again, the hugely disproportionate rate of admissions for Māori for diabetes, this time including gender. Of note, it can be seen that it is not until the age of 80 that non Māori male and female rates exceed Māori rates at the age of 45.
Figure 9: Hospitalisations Due to Diabetes by Age-Group - Numbers of Admissions
1995/1996

- Maori
- non-Maori

Number of admissions

age group

MĀORI HEALTH OPERATING GROUP – HEALTH FUNDING AUTHORITY
Figure 10: Hospitalisations Due to Diabetes by Age-Group - Numbers of Admissions
1996

Maori
non-Maori

Number of admissions

age group

MĀORI HEALTH OPERATING GROUP – HEALTH FUNDING AUTHORITY
Figure 11: Diabetes Hospitalisations 1995/1996 Mean Stay as Inpatients
Figure 12: Diabetes Hospitalisation Rates for the Total Population 1995/1996 by Age-Group and Gender

- Total Population Male
- Total Population Female
Figure 13: Diabetes Hospitalisation Rates 1995/96 Maori and Non-Maori by Age-Group

<table>
<thead>
<tr>
<th>Age-group</th>
<th>Maori Total</th>
<th>Non-Maori Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-</td>
<td>5.713</td>
<td>19.44</td>
</tr>
<tr>
<td>5-</td>
<td>20.54</td>
<td>27.78</td>
</tr>
<tr>
<td>10-</td>
<td>58</td>
<td>54.96</td>
</tr>
<tr>
<td>15-</td>
<td>19.14</td>
<td>45.56</td>
</tr>
<tr>
<td>20-</td>
<td>77.18</td>
<td>41.05</td>
</tr>
<tr>
<td>25-</td>
<td>82.77</td>
<td>41.67</td>
</tr>
<tr>
<td>30-</td>
<td>232.4</td>
<td>43.7</td>
</tr>
<tr>
<td>35-</td>
<td>639.3</td>
<td>96.65</td>
</tr>
<tr>
<td>40-</td>
<td>892.7</td>
<td>160.1</td>
</tr>
<tr>
<td>45-</td>
<td>906.9</td>
<td>161</td>
</tr>
<tr>
<td>50-</td>
<td>939.4</td>
<td>218.7</td>
</tr>
<tr>
<td>55-</td>
<td>1497</td>
<td>309.7</td>
</tr>
<tr>
<td>60-</td>
<td>0</td>
<td>199.1</td>
</tr>
</tbody>
</table>

MĀORI HEALTH OPERATING GROUP – HEALTH FUNDING AUTHORITY
Figure 14: Diabetes Hospitalisation Rates by Age-Group, Ethnicity and Gender 1995/1996
8.6 Mortality and Morbidity for Diabetes

The following graphs plot both mortality (1996) and morbidity (1995/1996) on the same graph to display the effect of age group on both measures and also the differing relationships between mortality and morbidity for Mãori and non-Mãori.

The graphs are:

- Figure 15: Mãori rates of hospitalisation (1995/96) and mortality for diabetes (1996)
  This graph shows that rates of Mãori hospitalisations rise for around a decade from the age of 40 before Mãori mortality begins to rise. Both rise steeply and peak at age 75.

- Figure 16: Rates of hospitalisation (1995/1996) and mortality for diabetes 1996 for Mãori and non-Mãori
  This graph clearly demonstrates the early experience of morbidity and mortality experienced by Mãori with diabetes. It can be seen that between the ages of 55 and 80, Mãori rates of mortality due to diabetes exceeds non-Mãori rates of hospitalisation for that age-group.
Figure 15: Maori Rates of Hospitalisation and Mortality for Diabetes
1995/1996

Age-group


Diabetes Hospitalisation
Diabetes Mortality

Age-specific rates per 100000
Figure 16: Rates of Hospitalisation (1995/1996) and Mortality for Diabetes 1996 for Maori and Non-Maori
9. MĀORI HEALTH SERVICE UTILISATION FOR DIABETES

9.1 Introduction

There has been a range of research identifying differing aspects of health service utilisation related to diabetes or health service utilisation by Māori in general (of relevance to diabetes). This chapter will discuss the findings of some of these studies.

Before discussing issues specific to Māori, it is important to understand what is meant by services for diabetes. The New Zealand Society for the Study of Diabetes, in 1995, published a position paper on what should constitute the core components of diabetic service in NZ. This is summarised here.

Core Components for a diabetic service (New Zealand Society for the Study of Diabetes 1995)

Introduction
This paper was presented to the New Zealand Society for the Study of Diabetes. It outlines the importance of diabetes in particular the high prevalence in Māori and Pacific peoples.

It outlined the following issues that reinforce the importance of effective diabetes services

- Diabetes is associated with a range of serious complications.
- Diabetes is the leading cause of cataract and new blindness, the largest cause of kidney failure and accounts for more than half the cases of lower limb amputations. Diabetes is associated with increased risk of coronary heart disease and other complications.
- There is evidence that symptoms of diabetes can be reduced by satisfactory control of blood glucose and good glycaemic control. Treating raised levels of blood pressure and foot care can reduce the risk of developing complications.
- This paper refers to recently published Diabetes Control of Complications Trial. It found that maintaining blood glucose at near normal levels greatly reduces the rate of new and worsening of established diabetic retinopathy, neuropathy and renal disease in insulin dependent diabetes.

This paper provides a series of core components for a diabetes service.

These core components are defined following:

1. General Requirements

- Services for diabetes should be in core health services
- Services should be accessible and culturally sensitive
- There should be a collaboration between primary and secondary health care services
Quality assurance is important
• Computerised register of people with diabetes is required
• Health promotion should be developed alongside diabetes service provision

2. Screening for Diabetes
• Those with symptoms suggestive of diabetes should be tested
• Those presenting with medical conditions associated with diabetes should be screened every three years
• Those with impaired glucose tolerance or diabetes during pregnancy should be screened annually.
• People over 40 with a positive family history or who are overweight or are of non-European descent are regarded as high risk and should be screened every three years.
• The usual screening test is a random postprandial or fasting blood glucose measurement followed up with that as recommended in the European Consensus and the NZSSD guidelines.
• Screening is primarily undertaken in general practice.
• Screening in other than high risks groups is not recommended.
• Pregnant women are offered a formal glucose test.
• This was under research at the time of the paper.

3. Services required at the time of diagnosis of diabetes
• Medical evaluation.
• Comprehensive medical examination including weight, body mass index, blood pressure, peripheral vasculature, peripheral nervous system and foot examination.
• Regular retinal screening. This should be at the time of diagnosis for people with NIDDM.
• Lab examination to include fructosamine and/or Hb A1C, urea, creatinine, fasting lipids, liver function and urine for culture, protein and microalbumin.
• Education. Formal education programme about diabetes and management, self monitoring, lifestyle modification and foot care is required. They state programmes ideally involve four to five 2-hour teaching sessions.
• For NIDDMs individual assessment should be in specialist based diabetes services.
• For NIDDMs initial assessment carried out by general practitioners with data entered into registers. GPs should decide as to a specialists input. Education may be provided by practice nurses. Family members also need instruction.

4. Services required for ongoing care of people with diabetes
• A formal programme of follow up and specific goals should be established.
• Regular ophthalmological review is required. This should generally be two to three yearly until retinopathy is detected then annually.
• Regular assessment of weight, blood pressure, glycated haemoglobin or fructosamine six monthly. Examination for neuropathy, peripheral vascular insufficiency and condition or feet annually. Blood samples for plasma lipids, creatinine and urine for measurement of microalbuminuria annually.
• Children, adolescents, young adults, pregnant women and those with complications should be seen in specialists clinics as well as by GPs.
Consideration of patients with NIDDM for insulin therapy is likely to continue to be an important reason for referral.

- Home glucose monitoring is important and choice of monitoring equipment should be made depending on the needs of the person.
- Regular review by diabetes educator, dietician and podiatrist as required.

4. Registers, records and outcomes

- A register of people with diabetes with structured records and method of recall is important to any system of care for people.
- It is recommended that a computerised register be established in each area which will link to those providing a service for patients with diabetes.
- Payments for services by people with diabetes.
- The risk of some disabling and life threatening complications can be decreased by appropriate surveillance, early detection and management of complications. Social cost to patients and their families of developing these complications is beyond measure financial cost to healthcare and social security services is prohibitive. "It is therefore in the interest of public good that certain basic services are provided free of charge to ensure they will be available to those who need them most."
- It is recommended that every person with diabetes should be entitled to the following services without charge—
  - Screening
  - Initial assessment and management.
  - All diabetes care for children.
  - All antenatal care.
  - For adults annual clinical and ophthalmological and blood tests.
  - All contact with diabetes educators and dietitians.
  - Annual review by podiatrist,
  - All diabetes care for those receiving pensions, benefits or classified as chronically ill.


9.2 Knowledge of Diabetes

9.2.1 Perceptions of Diabetes

(Kirkwood et al. 1997)

Summary
This study aimed to assess knowledge and opinions of diabetes among Māori rural elders and spokes peoples it involved interviewing in rural south Auckland. The main researcher was a kuia who was chosen from the local community. Interviews were conducted with 43 subjects. Key findings were that specific diabetes knowledge was low however it was seen as a major health issue for Māori. Recognition as of diabetes is a major health problem. For diabetes education that will "generate interest and participation by Māori". They suggest that marae based diabetes awareness and exercise programmes is part of diabetes prevention and control strategies among Māori communities where diabetes risk is high if needed.
Method
A networking style patterned on Rapuora study was utilised in order to obtain subjects for study. Kuia and family members participated in the planning of research. An interview schedule was developed using previously validated questions related to diabetes knowledge and exercise as well as other questions relating to issues particular importance for Māori. The kuia as main researcher distinguished between kaumatua and kuia aged 45 and upwards and younger. People were interviewed in their own homes mainly.

Results
• Using census figures it was estimated that approximately 80% of Māori aged 45 or over had been interviewed.
• Mean age was 48 +/- 10 years and ages ranged between 28 and 79 years.
• 26% of the sample were diabetic.
• 49% were male.
• 84% were Māori.
• Māori spoke in exclusively the home in 14%.
• 23% spoke both Māori and English at home.
• Major iwi was Tainui (70%).
• 26 reported smoking.
• 35% utilised Māori medicine, 5 of those (approximately 11%) of them had diabetes.
• Of those with diabetes 91% had a diabetic sibling and 46% diabetic parents.
• Those with diabetes had a knowledge of 60 +/- 33% while non-diabetic subjects had a score of 19.
• Among non-diabetic subjects only 16% were able to name any symptoms of diabetes.
• 29% could name any diabetic complications.
• 81% recognised diabetes could be present without symptoms.
• 8% believed that diabetes was a communicable disease.
• Of those interviewed with regards to the most important health issue facing Māori of those who were diabetics 46% said this was the main health issue facing Māori compared to 26% of non diabetics.
• Heart disease and cancer both rated highly as health issues.

Discussion
It was felt that knowledge of the nature of diabetes was similar to that observed elsewhere for non-diabetic subjects and relatively good for diabetic subjects. In particular the importance of exercise as a controllable aetiological factor in diabetes was not well known among those with diabetes and even less so without diabetes.

The authors state that the present research points to a need to commence evaluated community and marae based diabetes awareness pilot programmes highlighting the role of exercise and the prevention and control of diabetes and reinforcing healthy eating habits. They also state formative and process evaluation remain essential components to facilitate the dissemination of programmes. The overall aim must be to achieve sustainability of programmes and participation.
9.3 Māori Attitudes To Diabetes and Services

9.3.1 Māori attitudes to Diabetes and Diabetes Health Care Delivery in North Canterbury

(de Lore et al. 1993)

This study aimed to obtain information about Māori attitudes to diabetes and services provided by a specialist diabetes clinic in Christchurch. Discussion was also initiated about local diabetes health care delivery. The method utilised was a questionnaire which assessed Māori attitudes to diabetes and diabetes specialist services available in Christchurch. Fifty-one Māori with non-insulin dependent diabetes who attended a specialist diabetes clinic at Christchurch received the questionnaire. Their findings included that 47 of 51 subjects were able to name one or more diabetes complications.

- Five subjects named heart disease as a complication.
- Ten of the 51 subjects indicated that they would prefer marae-based to hospital-based diabetes health care if they had a choice.

There were 85 questions in 5 sections. These were
- Demographic and medical information.
- Diabetes knowledge and self care
- Attitudes to currently available services.
- Financial aspects of diabetes care.
- Ideas about community education.

The questionnaire was delivered in a face-to-face interview by two Māori researchers. Interviews occurred between January and April 1992 and occurred mainly in the interviewee’s own home.

2% of the 51 respondents lived in an urban area with the remainder rural. The mean age was 53 years. Thirty-one were male and the mean duration of diabetes was 12 years. 30 of the 51 subjects reported speaking te reo Māori. 13 were on insulin only, 4 were treated with insulin and oral hypoglycaemic agents, 27 were on oral hypoglycaemic agents alone and 7 were diet-controlled.

Questionnaire Findings

- 33 out of 51 knew diabetes was more common in Māori.
- Four were unable to name any long term complications.
- Diabetes complications identified included eye disease (45 out of 51), lower limb complications (44 out of 51), renal complications (27 out of 51) and heart problems (5 out of 51).

Other findings included that the association between diabetes and reduced life expectancy had an effect on the way that around half of the people looked after themselves. Most people had made one or more lifestyle changes since diagnosis. Forty-five of the 51 interviewed felt completely comfortable about attending a hospital diabetes clinic. Sixteen did mention aspects of the clinic system that could be improved including a lack of Māori faces, lack of Māori spiritual presence at the clinic.
Other issues were waiting time at the clinic, difficulties reaching clinic by public transport and unfriendly staff. Ten of the 51 subjects indicated they would prefer marae-based health care, 17 out of 51 said it made no difference. Five of the 51 said they would prefer to be seen by a Māori health professional and 2 indicated for preference of seeing a European New Zealander. The remainder indicated no preference. Financial issues were mentioned by 14 of 51 subjects.

Financial issues were raised with some participants abstaining from visiting GPs on one or more occasions and some not taking medicines as prescribed because of cost. Nine subjects reported experiencing difficulties following recommended guidelines for healthy food because of expense. One participant identified the importance of understanding complications very early on in diagnosed diabetics and that young people should be subjected to "shock tactics."

The findings from the hui held included that Māori felt it important to talk to positive Māori role models, particularly those with good diabetes self-management skills. It was important for Māori with diabetes to have contact with other Māori with diabetes. An important finding of this was that the mainly pakeha researchers identified the importance of community-based health care delivery initiated by Māori. There is a need for marae-based diabetes clinics in areas with a low percentage of Māori population as well as in areas of high percentage Māori. It was noted that with regards to knowledge about diabetes in particular it was found people did not understand the relationship between heart disease and diabetes. This was needed to be a key issue in diabetes education for Māori.

9.4.1 Barriers to care

A study investigating barriers to diabetes care in South Auckland aimed to identify and quantify barriers to diabetes care perceived by diabetic people who were part of the South Auckland diabetes survey. A qualitative survey of 57 people with diabetes from a diversity of backgrounds was undertaken alongside quantitative information from 1862 diabetic residents in South Auckland. (Simmons et al. 1998). 30 barriers to care categories were generated. Although there were differences between ethnic groups, the top ten barriers were similar. Findings included:

Important barriers were:

- perceiving that the benefits of self-care were outweighed by the disadvantages (around 20% of Māori)
- lack of community based services (27% of Māori)
- limited range of services available (22% of Māori)

Simmons concludes that better defining and systematic action to decrease barriers would lead to an improvement in diabetes outcomes.

9.4.2 Cost as a Barrier

This paper by David Simmons (Simmons et al. 1996b) estimates the out-of-pocket expenses associated with diabetes care and its impact of self-care activities in South Auckland.
This study utilised follow-up from the South Auckland study identifying those with known diabetes. The questionnaire was undertaken in the 1629 residents with known diabetes. Responses were received from 75% of those subjects remaining resident in the area. When calculated the median annual costs of prescriptions, shoes, clinic and general practice visits ranged between $191 and $329 depending on ethnic group. Simmons found that costs were higher among males, those requiring insulin and those aged under 60. Of note the following key findings were found:

- 18 to 49% of subjects reported cost prevented self blood glucose monitoring, 11 to 47% reported costs prevented self-medication and 8 to 52% reported costs prohibited regular insulin therapy among insulin treated patients. Simmons concludes that the out-of-pocket expenses associated with diabetes remains a substantial portion of disposal income and a barrier to the prevention of diabetes-related complications. The recommendation made is that this data supports the provision of preventive diabetes care at no cost to the patient at the point of care.

- With regards to the characteristics of the Māori in this sample there were 381 Māori identified in the original survey. At the point of this study, 133 had moved leaving 227 to participate in this study who were eligible. 31.7% of all those eligible did not participate thus there were 155 Māori surveyed in this study. The average age was 50 plus or minus 11 years. 55% were female and the duration of diabetes in years was 9 plus or minus 9. 31% were insulin-treated and 59% tablet-treated. 40% were on anti-hypertensive therapy and 77% had a community services card. Only 6% had a high user card.

Key points in the discussion in this study are based on very strong evidence for the need for tight glucose control in both Type 2 diabetes. Simmons identifies that there are benefits also from intensive blood pressure management. He states "the evidence that intensive pharmaceutical intervention, with frequent clinical monitoring, reduces the impact of diabetes in a substantive way is indisputable. Such care is also cost-effective." Simmons states also that "costs for preventive care in New Zealand are probably excessive in relation to income. Combining the data in relation to weekly income per person and weekly costs, diabetes probably accounts for a substantial proportion of disposable income. This study confirms that such costs impact on preventive treatment among a large number of patients ...." The need of aggressive pharmacotherapy among diabetic patients is further demonstrated in Simmons' paper by the finding that diabetic patients have the same risk for a coronary event as patients who are post-mycardial infarction.

Patients in the Simmons study were asked about what aspects of diabetes care should be free. The majority identified that medication and testing materials should be free.

9.5 Māori and Primary Care for Diabetes

It is identified that effective primary care is an important factor in minimising morbidity and mortality due to diabetes. There is as yet, no specific studies into Māori patterns of utilisation of primary care for diabetes however there has been some studies identifying how Māori utilise primary care services in general. These are outlined here.

There have been several New Zealand studies that have investigated Māori and non-Māori utilisation of Primary Care for general health reasons. The issues of Māori /
non-Māori differences in utilisation patterns and rates has been a feature of these studies alongside how well utilisation matches need.

- **Key findings from the studies have been:**
  A study of general practice of Waikato investigated Māori and non-Māori patterns of contact, expressed morbidity in resource use (Davis et al. 1997). Key points in this report include:
  - It was found that the annual rates for general practitioner contact for Māori are slightly lower than most for patients of non-Māori background.
  - The case mix of general practitioner contact was very similar between Māori and non-Māori.
  - There was a very limited correspondence between “ethnic patterns of general practitioner usage and health need (as measured by mortality levels and rates of public hospital discharge).”
  - Their final conclusion was that attention must be devoted to improving access to general practitioner services for Māori in order that “important areas of illhealth and hospital resource use are to be addressed effectively”.

In 1996 Laurence Malcolm published a report with regards to inequities and access to and utilisation of primary medical care services for Māori and low income New Zealanders (Malcolm 1996). This study investigated payments for GMS (General Medical Services Benefit) in community service card categories, laboratory and pharmaceutical expenditure and utilisation of general practitioner related ACC services. Eight health centres serving Māori and low-income groups provided data on practice registers and other factors as mentioned previously. Data was age and community service card adjusted and was then compared with national data. Of importance they found that the rates of utilisation in the centres studied i.e. those where there were high Māori and low income were significantly lower than national figures and in all community service card categories. When adjusted for age and community service card status the total expenditure in primary medical care and related services for their centre was only around 40% of the national average. Malcolm concludes that this study confirms gross under utilisation on expenditure of primary medical care and related services to Māori and other New Zealanders in poor circumstances.

A further study of office encounters in General Practice in the Hamilton health district investigated social and economic status and ethnic group patterns amongst children from 0-15 (Davis 1987b). They found a lower than average use of primary medical care by children of low socio-economic background. Of interest this study found a higher than expected level of medical contact for Māori in this age group. Both groups showed a high rate of contact for more severe symptoms suggesting that utilisation was occurring when illnesses were more severe.

A further study from Hamilton, (Davis 1987a) described office encounters in General Practice in Hamilton amongst Māori and non-Māori women age 15-64. The Māori to non-Māori contact ratio of 1.3 was contrasted with a relative risk of mortality of 2.4. This Māori excess in usage was less close to approximating the distribution of medical needs in the corresponding population in comparison among men. Of interest when social class was controlled for the gap was reduced between need and medical contact, suggesting that social economic factors are important in influencing ethnic differences in the use of GP services.

In the same Waikato study when investigating males it was found that Māori rates of utilisation were on average 40% higher than those recorded for non-Māori males. Of
interest controlling the social class did not alter this discrepancy and although Māori and non Māori difference in the rate of office encounters was greater than that reported for the equivalent social class comparison, "it still fell far short of ethnic difference in the burden of illhealth that was indicated by the available epidemiological evidence." (Davis 1986).

In 1998 Davis et al published a study that reviewed social variations in service use and clinical activity across two time periods (1979-80 and 1991-92). Between these two time periods, the number of general practices available grew. They conclude that there was a notable increase in the rates of primary care utilisation by Māori and those in low socio-economic groups accompanying the growth in the availability of general practice services. Given what we know about the likely under utilisation of primary care services by Māori (relative to need) then any moves to decrease or limit GP numbers in an area that is less well served may lead to lower use by Māori. It also indicates that differing groups may have differing responses to interventions and that for Māori an increase in GP availability may contribute to increased access and utilisation.

These studies raise some important issues. Firstly, it appears that there is under utilisation of primary care by Māori relative to Māori need. Secondly, it appears that for Māori women in particular, socioeconomic factors strongly contribute to under utilisation and ethnicity factors strongly contribute for Māori men. All studies indicate likely unmet healthcare need within the community. With regards to diabetes, it is likely that this under utilisation of primary care impacts on attendance at primary care for treatment of diabetes. Cost barriers and other barriers may act, not only as barriers to GP attendance, but also as barriers to being able to pay for prescriptions.

### 9.6 Māori and Hospitalisation for Diabetes

#### 9.6.1 Patient Discharges from Middlemore Hospital in 1983

(Isaacs and Scott 1987)

**Summary**
This study provided a case note review of all diabetic admissions to Middlemore to 1983. There were 317 admissions from 225 patients that were reviewed of these there were 204 diabetes related admissions. The population was described.

**Method**
This was a retrospective case note review from 1983. Patients who were identified with an ICD code of diabetes mellitus and its complications were reviewed. In this study people were classified as having insulin dependent diabetes if there was a documented episode of diabetic ketoacidosis or were European patients younger than 30 years of age. All other diabetic patients were NIDDMs. Admissions were diabetes related if the reason for admission was directly attributable to diabetes for its long-term complications. Admissions were broken down into six groups.

**Results**
- There were 225 patients in this study population who had 317 admissions. 153 had one admission, 56 had 2, 12 had 3, and 4 had 4.
- 48% were male.
- 70% were European, 20% were Māori, 9% were Polynesian, 1% were other groups.
European - mean age was 64, Māori - mean age was 55, Polynesian - mean age was 57.

There were significantly more patients in the older than 70 years in the European group as compared to the non-European.

Of the weights recorded mean weight was 69kg for Europeans, 83kg for Māori and 83kg for Polynesian.

65% of Non European males and 51% of non-European females weighed more than 80kgs.

28% and 19% of European males and females respectively weighed over 80kgs.

73% of European patients and 94% of non-European were NIDDMs.

In NIDDMs, ethnic groups had different treatment regimens on discharge.

European patients were discharged on insulin treatment on 38% of admissions, taking oral hypoglycaemic agents in 43% of admissions and using diet alone in 15% on no therapy in 4% of admissions.

For non-Europeans 17% were discharged on insulin treatment, 48% on oral hypoglycaemics, 23% on diet alone and 12% on no therapy.

Admissions for late complications were more common in patients who were NIDDMs.

31% of all admissions were for either peripheral vascular disease, ischaemic heart disease or chronic renal failure compared with 15% of IDDMs.

The pattern of admissions was similar for European and non-European patients except for those with chronic renal failure where 21 of 22 admissions were by non-European patients.

22 patients (10%) died in hospital.

In total the 225 patients spent 6086 days (average stay 19 days) in hospital with a calculated cost of $1 200 080.

204 admissions were diabetes related occupying 4040 hospital days an average stay of 20 days calculated cost of $7798 528.

Patients with peripheral vascular disease accounted for 34% of the calculated total cost.

37% of diabetes related admissions were for late complications of peripheral vascular disease, ischaemic heart disease and chronic renal failure accounted for 51% of the total cost.

Discussion

With regards to prevalence, the authors state that changing diagnostic practices mean that it is difficult to compare with earlier studies. The observed admission ratio in this study was 2 European to 1 non-European. This is the reverse of the 3 to 5 ratio expected based on this prevalence data. There are ethnicity differences in the age of admission, the incidence of chronic renal failure, and treatment, particular the use of insulin therapy in NIDDMs. They state that "the reasons for these differences are not established from our data but are of crucial importance if all areas of the community are to receive adequate treatment".

The authors state that the cost analysis allowed comparison of the costs of various late complications. It does not however allow assessment of actual cost in terms of health dollars.

They find however that there is a striking result of the cost analysis in the amount of resources consumed by few patients with peripheral vascular disease. They suggest that enhancing out-patient podiatry services is one logical measure to minimise some of the costs.
Costs are also strongly associated with late complications and a significant reduction in patient costs requires an intervention to prevent late complications. These interventions are identified as “early diagnoses, better glycaemic control and patient education”.

Authors also outline a number of the areas concerned including:

- The lack of good epidemiological data on which to base decisions.
- A major obesity problem affecting mainly non-Europeans but not exclusively.
- Low usage of insulin treatment by non-Europeans NIDDMs compared with European NIDDMs.
- Lower rate of hospital admissions for non-European patients than would be expected on population distribution.
- Large hospital costs of macrovascular disease effecting the limbs.
- Incidence of chronic renal failure amongst non-European populations.

Final comments are “The use of community resources, particularly Māori and Polynesian resources, may alter some of these areas, but further intensive research is required to provide better insights into these problems; in particular, theoretic and practical nutritional research is required. By deploying hospital resources at an earlier stage in the community setting via nurse educators and community health workers it may be possible to avoid, or at least delay, late diabetic complications and improve the outlook for south Auckland diabetic patients”. (Isaacs and Scott 1987).

9.7 Complications

9.7.1 Ischaemic Heart Disease

(Dancaster and Tait 1982)

This paper looks at ischaemic heart disease in New Zealand Māori and non-Māori and an age adjusted incidence in hospitalised patients over 10 years. Of particular interest for diabetes the issue of diabetes was identified as a risk factor for ischaemic heart disease.

Of relevance to diabetes the prevalence of diabetics was gauged to be present in 30% of Māori with ischaemic heart disease. This contrasted with a prevalence of 9.2% among males and 7% among females in the general population.
9.8 Diabetes Interventions

9.8.1 A pilot diabetes awareness and exercise programme in a multiethnic workforce

(Simmons et al. 1996a)

This study compared subjects with controls in the evaluation of the acceptability and impact of a pilot diabetes awareness and exercise programme.

Workers at a hospital were divided into two groups. One received community diabetes education and presentation, video presentation and a four month exercise programme. The other were controls. Key findings were that diabetes knowledge was poor and subjects were largely unfit with high BMI. Exercise sessions were initially well attended although attendance dropped off over four months. Of note increased diabetes knowledge was retained in the intervention group after six months when compared with controls. A month after finishing the programme, the proportion reporting regular exercise activity had increased by 2% in the intervention group but decreased by 9% in the control group. Authors conclude that diabetes knowledge and exercise can be increased in unfit subjects by the combination of culturally tailored exercise techniques and community education videos.
10. SUMMARY OF MĀORI AND DIABETES

10.1 Summary

10.1.1 Prevalence

Māori prevalence of known diabetes has been shown to be 8.3% in the adult population with a possible similar level of unknown diabetes in the community. Prevalence increases with age and increases with degree of overweight.

10.1.2 Risks

Māori are at increased risk of type II diabetes associated with low social and economic status and with other individual risk factors such as increased weight and family history. Māori are also at increased risk of poor outcome due to experience of factors associated with complications including increased likelihood of urinary microalbuminuria and increased prevalence of smoking.

10.1.3 Mortality

Māori rates of mortality for diabetes are significantly higher than non-Māori. Of extreme concern, levels of mortality also are higher at younger age groups thus leading to diabetes being a significant cause of premature death in Māori. Māori also have increased mortality due to conditions that are associated with worse outcome if also diabetic such as renal conditions and ischaemic heart disease.

10.1.4 Hospitalisation

As with mortality, Māori hospitalisation rates for diabetes are also significantly higher than non-Māori, particularly in those aged 45-70. Māori rates of hospitalisations for conditions associated with diabetes are also very high.

10.1.5 Health service utilisation for diabetes

There have been a range of studies about health service use that informs on Māori utilisation of services for diabetes. Due to limitations in scope, only a few have been discussed in detail. It is likely that Māori are under utilising primary care and specialist diabetes clinics relative to prevalence and need. It appears that use of services, understanding of services etc may be different across the country as services differ considerably. Barriers to services and treatment includes the negative perception of treatment, lack of community services and cost. With regards to knowledge about diabetes, it appears, from one study that Māori with diabetes have a less than ideal understanding of some of the complications of diabetes (heart disease in particular). Overall the picture is one of less than optimal care for diabetes and less than optimal outcome.
SECTION THREE:

MĀORI HEALTH GAIN AND DIABETES
11. MĀORI AND HEALTH GAIN FOR DIABETES

11.1 Issues

Key issues for health gain with regards to diabetes are:

- Diabetes leads to considerable morbidity and mortality in Māori therefore it is an area of high importance for achieving health gain.

- Type II diabetes is linked with low social and economic status. It is also associated with increased rates in indigenous peoples and there is likely an association with food poverty. Health gain may be achieved through strategies that deal with the broader determinants of health. Income inequality (relative poverty) as well as low income (absolute poverty) are both likely factors in the high levels of diabetes in Māori and more poor outcome.

- The negative impact of colonisation both directly (through such mechanisms as institutional racism / power differential in society and government) and indirectly (through its impact on social and economic status) contribute at a more general level to risk and outcome from diabetes. Thus strategies that are directed at dealing with disparity will also, lead indirectly to health gain for Māori.

- Linked with the above, prevention and promotion are important components of achieving health gain. Any programmes must take into account the context of Māori lives and the broad social and economic determinants have on health. Programmes that do not take these into account, run the risk of heading down a "victim blaming" path focusing specifically on risk factors without acknowledging the reality of the lives of many Māori. Some specific examples are discussed below.

- Early detection of diabetes is a further key area for health gain. This issue also, cannot be separated from the above issues. The role of opportunistic screening for Māori must be viewed in light of knowledge around barriers of access to primary care, awareness of diabetes and the need to screen and the level of advocacy for Māori within primary care. Population based screening is controversial however very important to consider as an option for early detection of diabetes. The development and ensuring of high quality and effective services to meet the needs of Māori with diabetes is needed in conjunction with screening.

- Māori have high rates of morbidity, hospital admissions and mortality due to conditions associated with diabetes (ischaemic heart disease, eye disease, peripheral vascular disease, renal disease) and improved management of glucose control and of complications has the potential to lead to health gains. Ensuring Māori receive best practice and ensuring outcomes can be monitored against non-Māori may be one way of ensuring that care received is optimal. The issue of access to services and barriers to services (including access to treatments) are essential.
11.2 Intervention at the Level of Risk Factors

11.2.1 Smoking

This has been raised as an area for health gain in the previous section. A continued prioritisation of the need to decrease smoking in Māori is warranted. The impact of smoking both environmentally (through health problems associated with passive smoking) and actively (through health problems in smokers) is very severe on Māori health. Smoking associated with diabetes leads to increased risk of heart disease and vascular disease thus compounding the negative health effects of diabetes. It was recommended in the "Smoking" report (health gain priority area report) that smoking be given very high status as a priority area. It was further recommended that there needed to be a pooling of knowledge from those Māori working in the area of smoking (decreasing uptake, cessation) to contribute to future smoking strategy and to influence purchasing.

11.2.3 Access to health services and management of diabetes

A further issue of extreme importance for Māori, is access to health care services and outcomes from those services. For those with diabetes, a good relationship with primary care is essential with minimal barriers. It has been outlined that Māori likely underutilise primary care relative to need.

Access to health care services is linked to income and poverty. It has been found that for those families who are poor, cost is a real barrier to both attending health care services and uptaking prescriptions (Waldegrave et al. 1999).

The concerning findings from studies that identified that Māori were receiving different treatment for than non-Māori despite high levels of morbidity raises issues of bias in prescribing alongside barriers related to cost (Simmons et al. 1999b). Issues around this have not been fully explored however the following are possible explanations.

It is possible that those people providing treatment for Māori, are differentially managing on the basis of ethnicity, based on an assumption that Māori may be less likely to take prescribed medication (for whatever reasons). The possibility that Māori are not receiving 'best practice' in terms of management, on the basis of ethnicity is raised.

A second hypothesis, is that Māori do not take medication due to lack of understanding of its importance or due to other factors such as not being able to afford it. It this is so, then it is essential that services take this into account in determining how, when, where and to whom information about diabetes and its management are given. Issues of literacy and income may impact also on how able people are to access information.
12. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

12.1 Summary

Diabetes is prevalent in Māori with 8.3% of Māori adults having known diabetes and potentially a similar proportion with diabetes who do not know. Māori have increased levels of risk factors for diabetes and are at risk through overrepresentation in those of low social and economic status. Hospitalisation rates and mortality rates for Māori with diabetes indicate earlier morbidity and mortality and higher morbidity and mortality. This seems to be ‘earlier’ than non-Māori even when increased Māori prevalence is taken into account.

This is consistent with findings from research looking at Māori utilisation of health services for diabetes that show that Māori present at an earlier age, but often with more complications than non-Māori.

Areas for health gain thus span the full range of possible areas from dealing with the broad determinants of health, through to ensuring best practice in the management of diabetes and its determinants. Ensuring services are developed with an awareness of the context of Māori lives is essential.

12.2 Conclusions

- Diabetes is an important health issue for Māori and in particular for Māori pakeke.
- There are links between diabetes morbidity and mortality and smoking and thus addressing smoking will contribute to health gain for Māori.
- There is an association with the impact of colonisation including broader social and economic factors that likely contribute to a range of risks including those related to nutrition, weight and access to screening and treatment services.
- It is important that there is strong Māori input and a Māori analysis of purchasing priorities and services for diabetes as the context of Māori lives and a range of related factors will likely influence what services are needed, what services are accessible and what services are effective.
12.3 Recommendations

1) It is recommended that diabetes continue to be considered a high priority for Māori health and by the Māori Health Group, the HFA and the Ministry of Health.

2) It is further recommended that many of the particular individual strategies outlined in the Ministry of Health report "Strategies for the Prevention and Control of Diabetes in New Zealand" be supported. However, there is a need for priorities for Māori to be determined based on Māori need. With regards to strategies outlined, intended for Māori, it is imperative that there is strong Māori analysis and participation in the development of purchasing strategies. These may be linked with the following recommendation for a specific Māori strategy. It is recommended that there be a specific Māori strategy developed with the aim of achieving health gain for Māori with diabetes. This must take into account the context of Māori lives, Māori diabetes risk profile and health status of Māori, health beliefs, health behaviours and relevant cultural issues. Such a strategy would need to be linked with any national diabetes strategy however be specifically centred on Māori.

3) Any overall diabetes strategy development (policy, purchasing) in New Zealand should have strong Māori participation in order to ensure the range of issues associated with Māori and diabetes are addressed in a meaningful way for Māori. It is recommended that the level of Māori participation in present diabetes policy and purchasing strategy be assessed. Gaps in terms of Māori participation should be rectified.

4) Māori specific information, resources and education on diabetes should be available. It is recommended that there be (if not already done) a stocktake of diabetes information that is relevant for Māori with identification of gaps and development of resources accordingly.

5) It is important that the level of mortality and morbidity due to diabetes can be monitored. Further, given that it is possible that there may be differential prescribing or differences in pick up rates of diabetes treatments occurring on the basis of ethnicity, it is recommended that accurate ethnicity identification be expected. This should occur on hospital and accident and emergency data bases, HBL data and primary care. Feedback to providers, including Māori providers providing services for those with diabetes about levels of hospitalisation for diabetes in their populations will be important for services to monitor own performance and make comparison.

6) Aligned with above, in order to determine whether health gain is being achieved for diabetes, it will be important to decide on particular indicators for gain and monitor these in association with interventions. Such indicators could include mortality, hospitalisation, presentation to Accident and Emergency and After hours medical centres and use of primary care. The use of NHI numbers in primary care and the collection of accurate ethnicity data will contribute to better ability to monitor in this way.

7) It is recommended that further information gathered around any differences in management of diabetes in Māori and non-Māori given the concern...
that Māori may receive differing treatment than non-Māori. It is important that Māori receive best practice in terms of care for diabetes and difficulties in achieving best practice (through service factors or factors associated with Māori with diabetes) be identified and addressed.

8) Primary care and secondary care services need to incorporate understanding of particular needs of those whānau who are at highest risk of not accessing or adhering to treatment due to factors such as mobility, poverty, lack of understanding etc.

9) The value of a community based approach to diabetes has been shown. It is recommended that the purchasing of services that take a similar approach be investigated as a viable option for delivery of services relating to diabetes for Māori.

10) There is evidence that Māori do not use primary care relative to need and that it is important to take into account the context of Māori lives when delivering services. It is recommended that the Māori Health Group investigate the development of services that work within this context (e.g. mobile nursing / health promotion / education / service co-ordination) in order to enhance primary care services for those with poor access. Given that there are similar issues in terms of access and utilisation for Māori with diabetes and Māori with heart disease, then a service that deals with a range of health issues may be most effective. Providing flexible services for whānau will likely be a successful approach for whānau with multiple needs.

Suggested specific strategies that may address areas of health gain for Māori are also described here.

In order to achieve health gains for diabetes a range of strategies and interventions should be considered under the following:

**Ensuring healthy and adequate kai through:**
- Ongoing support of initiatives decreasing the social and economic gap between Māori and non-Māori (broad determinants of health). Ensuring adequate food source for Māori whānau through broad public health approaches that decrease the impact of poverty, poor housing and transport on food security and access to appropriate food.
- Improved access to present mainstream and Māori nutrition programmes; addition of new programmes to meet gaps; potential for specifically targeted diabetes prevention to those most at risk.
- Promotion of health and wellbeing with particular focus on nutrition, exercise and mental health (motivation) as part of broader health gain strategies.

**Early detection of diabetes** through a planned approach to screening those most at risk. It is recommended that a specific project be undertaken to consider the benefits/risks of a well planned and executed “population-based screening of Māori and other groups at high risk” be undertaken. Such a screening programme would need to be well planned and ensure that all criteria for screening are met (including provision of effective services) — early detection must be associated with strategies for better outcome. With regards to opportunistic screening, increased awareness of diabetes within the community, decreased barriers of access to primary care and increased
awareness of the risk of Māori with regards to diabetes for health professionals are all potential strategies.

**Aim for excellence in glucose control** (clinical and self-management) through range of strategies including diabetes education, diet, exercise. Programmes need to take into account context of peoples lives eg take into account cultural, economic circumstances, social and medical support. It is recommended that within a specific Māori strategy, guidance is given for how this could be achieved and what services need to be purchased.

**Enhanced primary care.** Given the evidence that Māori do not use primary care relative to need it is important to take into account the context of Māori lives when delivering services. This report recommends that the Māori Health Group investigate the development of services that work within this context (eg mobile nursing / health promotion / education / service co-ordination) in order to enhance primary care services for those with poor access. Given that there are similar issues in terms of access and utilisation for Māori with diabetes, chronic respiratory disease and heart disease, then a service that deals with a range of health issues may be most effective. Providing flexible services for whānau will likely be a successful approach for whānau with multiple needs.

The development of Māori specific best practice guidelines that are informed by what is known about successful health promotion and health service utilisation by Māori could be considered from within the context of a Māori strategy.

**Community Development:** This report supports community development approaches in health promotion and prevention of diabetes, and in meeting the needs of those with diabetes (eg Wairarapa Asthma Project). A recommendation is made that models of this kind of initiative be reviewed with Māori and diabetes in mind. The possibility of purchasing Māori community based initiatives that run along community development lines needs to be considered by the Māori Health Group in association with Public Health and Personal Health

**Smoking:** There are strong links with smoking and diabetes (those with diabetes who smoke have a more poor outcome). There for any it is recommended that strong support continue to go to decreasing the impact of smoking on Māori through decreased uptake and smoking cessation. Again this needs to take into account the context of Māori lives and the need for intervention not only with individuals and whānau but also with the broad determinants of health and wellbeing.

Interventions will need to be matched to settings for example for some a home based approach may be preferable to group based programmes and services whereas some will benefit from community based initiatives. Choices need to be made available when possible.
REFERENCES


