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**The
Epidemiology of
Diabetes Mellitus
in the ACT**

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The Epidemiology of Diabetes Mellitus in the ACT

Table of contents

1. Introduction	5
1.1 What is diabetes mellitus?	5
1.2 Overview	5
1.3 Prevalence of diabetes mellitus in Indigenous Australians	6
2. Mortality	7
2.1 Age-specific mortality	8
2.2 Years of potential life lost	8
3. Morbidity	9
3.1 Division of GPs Diabetes Project	9
3.2 1989-90 National Health Survey	9
3.3 Third National Survey of Morbidity in General Practice in Australia	10
3.4 Hospital morbidity	11
3.4.1 Separations	11
3.4.2 Re-admissions	12
3.4.3 Average length of stay	13
3.4.4 Gestational diabetes, complications of pregnancy and childbirth	14
3.5 Disability and/or reduction in quality of life caused by diabetes	14
3.5.1 National Health Survey 1989-90	14
3.5.2 Other research	15
4. Diabetes management strategies	16
4.1 Medical Outpatients Clinic, Woden Valley Hospital	16
4.2 ACT Division of General Practice Diabetes Project	17
4.3 ACT Health Goals and Targets for the Year 2000	19
4.4 National Action Plan - Diabetes - To the year 2000 and beyond	19
4.5 Collection of accurate data	19
4.5.1 ACT Hospital Morbidity Collection	19
4.5.2 The National Health Survey	19
4.5.3 The ACT Care Continuum and Health Outcomes of Hospital Inpatients Project	20
5. References	21
6. Glossary	22
Appendix 1: Limitations in developing a diabetes mellitus profile	23
1989-90 National Health Survey	23
Appendix 2: Diabetes Australia activities	24
Diabetes Australia	24
National Action Plan - Diabetes - To the year 2000 and beyond	24
Health Series Publications	25

Tables

Table 1:	Deaths caused by diabetes mellitus, by age groups, by sex, ACT, 1991-94	8
Table 2:	Selected health risk factors, ACT and Australia, 1989-90	9
Table 3:	Self-reported diabetes/high blood sugar levels, by age, by sex, Australia	10
Table 4:	Estimated number of hospital separations for principal or secondary diagnosis of diabetes, by age, ACT, 1993-94	11
Table 5:	Estimated number of hospital separations for principal diagnosis of diabetes, by age, ACT, 1993-94	12
Table 6:	Estimated number of hospital separations for principal or secondary diagnosis of diabetes, by type, by sex, by age, ACT, 1993-94	12
Table 7:	Number of hospital separations per individual, for principal or secondary diagnosis of diabetes, ACT, 1993-94	13
Table 8:	Number of hospital separations per individual, for principal diagnosis of diabetes, ACT, 1993-94	13
Table 9:	Number of hospital separations for principal or secondary diagnosis of diabetes, by type, by sex, by length of stay, ACT, 1993-94	14
Table 10:	Number of hospital separations for principal or secondary diagnosis of gestational diabetes, complications of pregnancy or childbirth due to diabetes, ACT, 1993-94	14

Figures

Figure 1 :	Number of deaths caused by diabetes mellitus, ACT, 1990-94	7
Figure 2:	Crude death rates per 1,000 population, by sex, ACT and Australia, 1991-94	7
Figure 3:	Persons aged 45 yrs or more with and without diabetes or high blood sugar, by reported long-term conditions, Australia, 1989-90	15

Diabetes Mellitus

1. Introduction

1.1 *What is diabetes mellitus?*

Diabetes Mellitus, usually referred to as diabetes, is a condition in which the body is unable to properly use glucose or sugar which is required for basic cell and organ function. It occurs when the pancreas is unable to produce sufficient insulin, or the insulin produced is unable to work effectively. Insulin is a hormone which normally circulates in the blood and assists the passage of glucose into the bloodstream and body cells. The most common types of diabetes mellitus are:

- Juvenile, insulin dependent diabetes (IDDM);
- Mature-age onset non-insulin dependent diabetes (NIDDM); and
- Gestational diabetes (first diagnosed when a woman is pregnant).

Serious clinical complications which can be caused by diabetes include adult blindness (leading cause), chronic kidney failure (major cause), coronary heart disease, stroke, peripheral vascular disease, amputations (leading cause) and impotence.

IDDM or Juvenile Diabetes refers to a disorder usually diagnosed in childhood although it can be developed during adolescence or adulthood. Its cause is unknown and diagnosis always results from severe symptoms. People with this type of diabetes will always need daily doses of insulin since the pancreas will never be able to process blood sugars without it.

NIDDM constitutes about 85-90 per cent of all diabetes in developed countries⁵ and usually occurs after the age of about forty years. Diagnosis may not be made for several years after onset, since symptoms are often not evident until the disease starts to seriously effect bodily functioning. NIDDM is strongly familial, but lifestyle factors are also major triggers. Potentially modifiable risk factors include: poor eating patterns (particularly the consumption of refined fats, sugars and alcohol) and lack of exercise often resulting in obesity. Appropriate diet, weight control and physical activity increases insulin sensitivity among insulin resistant patients and are effective treatments for patients with NIDDM, or may prevent the development of NIDDM in susceptible people¹⁵. Incidence increases significantly with increasing age.

Women who develop gestational diabetes usually only require careful monitoring during pregnancy to ensure that no complications arise. Such women are more likely to develop NIDDM in later life than the rest of the population however.

1.2 *Overview*

Diabetes is a condition of considerable public health significance in that it affects at least half a million Australians (some estimates are as high as 700,000)⁶ and is associated with a variety of other health conditions. Furthermore, it is associated with significant human and financial cost to the community and its prevalence is likely to increase significantly as the population ages. People from low socio-economic backgrounds⁷ (who are likely to follow poor dietary habits), those from certain racial groups such as Aboriginal people and Torres Strait Islanders, those born in Southern Europe, Pacific Islanders, Asians, and the elderly are more likely to be affected than the general population. Aboriginal people have a prevalence of diabetes approximately five times that of other Australians.

The financial cost of diabetes and its complications has been estimated at a staggering \$4 billion per year in Australia⁶. There is also considerable pain and suffering associated with the disease, stress on individuals and their families, and loss of independence³.

The condition is amenable to prevention (NIDDM only) and early intervention, as are the complications associated with the condition.³ Diabetes cannot be cured however, and requires lifelong treatment. The majority of sufferers can manage their diabetes with diet therapy, weight control and regular exercise, although some need oral hypoglycaemic tablets or insulin.

There are therefore, considerable implications for health planners in developing health targets and service delivery programs. This is particularly relevant when using capitation budgets¹⁶.

There are no accurate statistics available to gauge the exact number of diabetes cases nor the number of exact deaths caused by diabetes, in the ACT or Australia. Some of the major limitations in developing an accurate profile are discussed in Appendix 1. The Australian Bureau of Statistics Population Survey Monitor results indicate the national prevalence to be 3.8 per cent of all adults and 8.2 per cent of people aged 55 years and over.⁴ This equates to 8,380 cases of diabetes in the ACT including 4,357 cases in people over 55 years of age in 1994. The Diabetes Clinic at Woden Valley Hospital suggests that this is a very conservative estimate and puts the figure at more like 12,000, including 170 children - but this estimate includes NSW patients being treated in the ACT. Deaths actually identified as caused by diabetes represent the seventh major cause of death in the ACT in 1994.

The purpose of this report is to give as broad an overview as possible of the health profile of diabetes mellitus in the Australian Capital Territory with some comparative information in relation to the Australian population as a whole. It will assist ACT planners and policy makers of health and related services to ensure that people with diabetes are considered in appropriate planning of new or existing services.

1.3 Prevalence of diabetes mellitus in Indigenous Australians

As mentioned, indigenous Australians suffer diabetes mellitus at an alarmingly higher rate than that of other Australians. Crude prevalence rates lie between 7.5 and 16 per cent for Aborigines compared to 3.4 per cent for non-Aborigines. The peak of prevalence is at about forty years which is about thirty years earlier than for non-Aboriginal Australians. In the 20-50 year age group, the prevalence is over ten times higher than for non Aborigines.⁷

Since NIDDM is related to nutrition, housing and lifestyle factors, and since two of the major predisposing risk factors for diabetes, hyperinsulinaemia and obesity, are common in Aboriginal populations⁸, it would be appropriate to consider positive interventions in these areas to ensure improvements in the prevalence of such diseases as diabetes mellitus.

There is little information on Aboriginal people living in the ACT. What is available concerns the South East Region or the ATSIC Queanbeyan Region and not the ACT specifically. It is known that there were 1775 indigenous people living in the ACT in 1991¹¹ and 1969¹² in 1994. Although the increase in recent years is small, it is significant in planning for the prevention and control of diabetes for the group.

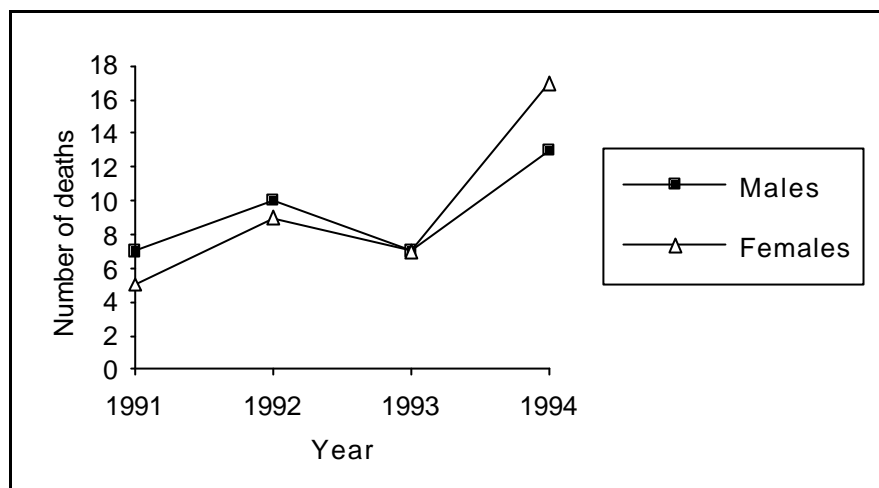
As part of the National Aboriginal and Torres Strait Islander Survey, 1994, data were collected on people living in the Queanbeyan ATSIC region. This region covers the ACT and parts of NSW bounded by Queanbeyan, Yass, Nowra, Batemans Bay and Eden. It was a self-reporting survey conducted through interviews. Of the 4575 people over the age of 13 who were interviewed, 551 (12%) reported that diabetes was a major health problem for them.

2. Mortality

Diabetes by itself is not a major life threatening condition if it is properly managed. It often has co-morbidities which are life threatening however, such as heart disease.

There were 30 known deaths caused by diabetes mellitus in the ACT in 1994 (13 males, 17 females), which equates to 2.5 per cent of all deaths in the ACT for that year.

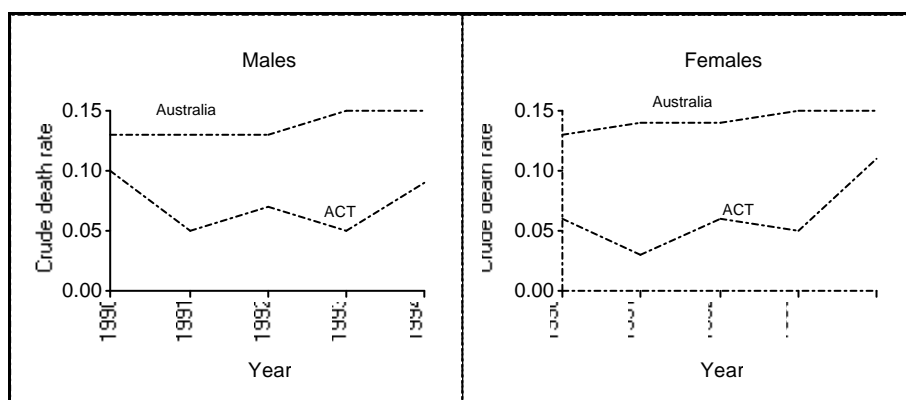
Figure 1 : Number of deaths caused by diabetes mellitus, ACT, 1990-94



Source: ABS, Causes of death Australia, 1991-94, Catalogue No. 3303.0

The ACT has a lower crude death rate from diabetes than for Australia as a whole. One would expect this, since the ACT has a relatively high socio-economic status (socio-economic disadvantage score of 1071 compared to 1,000 for Australia, at the Australian Census of 1991)¹⁰, the population is relatively young and it has a very small Aboriginal and Torres Strait Islander population (a high risk group). Since the ACT is a small area with a relatively small number of deaths from diabetes, fluctuations can be expected however. To remove the impact of fluctuations, it is useful to consider trends over a period of time. If you consider the crude death rates, it can be seen that males and females in the ACT have slightly lower death rates from diabetes than Australian males and females on the whole:

Figure 2: Crude death rates per 1,000 population, by sex, ACT and Australia, 1991-94



Source: ABS, Causes of death Australia, 1991-94, Catalogue No. 3303.0

Based on a four year average (1991-94) the ACT has a lower age-standardised mortality rate (10.9 per 100,000 people) than the Australian average (13.8 per 100,000). However, looking at individual year age-standardisation rates, in 1994 the ACT had a higher mortality rate (16.1) than for Australia (14.5). From 1991 to 1993 it had a lower rate. It will be interesting to monitor if 1994 was an atypical year for diabetes deaths in the ACT or whether a trend is starting to emerge where there is a high death rate.

2.1 Age-specific mortality

In terms of age at death caused by diabetes, it can be seen from Table 1 that diabetes generally causes death in the later half of life. There were no deaths in people under 15 years of age caused by diabetes in the period 1991-1994 in the ACT. This is to be expected since most diabetes is diagnosed as non-insulin dependent diabetes which is a mature age onset disease.

Table 1: Deaths caused by diabetes mellitus, by age groups, by sex, ACT, 1991-94

Year	Sex	Age groups							Total	Mdin age
		15-24	25-34	35-44	45-54	55-64	65-74	75-84		
1991	Male						4	2	1	7
	Female					1	1	1	2	5
	Total	0	0	0	0	1	5	3	3	12
1992	Male				2	1	2	4	1	10
	Female						4	4	1	9
	Total	0	0	0	2	1	6	8	2	19
1993	Male	1			1	1	3	1		7
	Female					2	1	4		7
	Total	1	0	0	1	3	4	5	0	14
1994	Male					2	4	4	3	13
	Female		1	1			8	2	5	17
	Total	0	1	1	0	2	12	6	8	30

Source: ABS, Cause of death, unpublished data, 1991-94

It should be noted that deaths recorded as caused by diabetes mellitus, are those deaths for which diabetes is the *principal* cause of death. It is estimated that many other deaths, although not resulting from diabetes principally, were nevertheless, caused by diabetes (eg death recorded as caused by a heart attack may have been the result of diabetes which was the underlying cause of the heart condition).

2.2 Years of potential life lost

Since death from diabetes usually occurs in older people, years of potential life lost (YPPL) is small. Estimated YPLL from diabetes deaths is 195 years or 1.47 per cent of total YPLL in the ACT in 1994.² This is a rise on 1993 when diabetes deaths resulted in 167 YPLL or 1 per cent of total ACT YPLL². (Standardised according to the Australian population as at June 1991).

3. Morbidity

Diabetes is a chronic condition which rarely warrants hospitalisation. General practitioners and staff at the Diabetes Clinic at Woden Valley Hospital typically attend to the care and treatment of people with diabetes. It has been estimated that diabetes is the eleventh most frequent condition managed by general practice in the ACT and represents 2 per cent of all patient encounters (ACT Division of GPs).

3.1 Division of GPs Diabetes Project

A project being undertaken by the ACT Division of General Practice aims, amongst other things, to establish a central database of diabetics which will assist in developing a more accurate profile of diabetes incidence and treatment in the ACT.

In the meantime, National Health Survey results, the Third National Survey of Morbidity in General Practice in Australia and ACT hospital separation data assist in developing a profile of diabetes prevalence in the Territory.

3.2 1989-90 National Health Survey

The Australian Bureau of Statistics (ABS) 1989-90 National Health Survey collected data from approximately 54,000 people living throughout Australia. The sample was designed so that the states and territories could be separately analysed. Limitations of the survey are outlined in Appendix 1.

Although the National Health Survey 1989-90 only used a small sample of ACT residents, some trends emerged. In relation to lifestyle factors, survey results (refer Table 2) showed a slightly higher proportion of adults in the ACT smoked tobacco and drank alcohol at a moderate or high risk level than in Australia overall. However, they exercised more and were either underweight or at more acceptable weight levels than national figures. It would appear that Territorians are generally not at high risk from lifestyle factors related to the onset of diabetes.

Table 2: Selected health risk factors, ACT and Australia, 1989-90

Selected health risk factors	ACT	ACT	Australia
	ratio	per cent	per cent
Smoker status -			
Smokers	100.3	30.3	28.4
Ex-smoker/never smoked	n/a	69.7	71.6
Alcohol consumption -			
No alcohol/low risk level	82.2 (no), 110.2 (low)	87.2	88.9
Moderate or high risk level	106.3 (moderate) 112.3 (high)	12.8	11.1
Exercise -			
No /low exercise level	83.2 (no) 106.1 (low)	63.3	68.0
Moderate or high exercise level	110.6 (moderate) 112.9 (high)	36.7	32.0
Body Mass -			
Underweight/acceptable weight	92.9	64.9	60.0
Overweight/obese	89.9	31.6	36.5

(a) Persons aged 18 and over (b) age-sex standardised ratio where Australia is 100.0 n/a means not available
Source: ABS 1989-90 National Health Survey

These dated figures should be interpreted with caution, since many measures have been taken after the survey to encourage a healthier lifestyle with some positive results.

In the ACT, 72.0 per cent of the population self-reported long-term conditions, as compared to 66.2 per cent of the Australian population. In terms of diabetes, the *Australian* results were that 1.9 per cent of males and 2.0 per cent of females over all ages, self-reported as having diabetes or high blood sugar levels. Age reported results are outlined in Table 3.

Table 3: Self-reported diabetes/high blood sugar levels, by age, by sex, Australia

Age	Sex	%
under 25 years	M	0.25
	F	0.38
over 25 years	M	3.1
	F	2.9
over 65 years	M	8.1
	F	6.9
All ages	M	1.9
	F	2.0

Source: Wellborn A, Knuiman M, Bartholomew H, Whittall D, Ref. 9

Age-standardised prevalences were higher for people born in Southern Europe and lower in those born in Western Europe compared to Australian born respondents. Prevalences were high in households where the language spoken was other than English.⁹ These findings have relevance for the ACT in that at least 12 per cent of ACT residents were born in Asia and Europe excluding the UK, at the time of the Australian Census in 1991. It should be noted however, that many of these ACT people speak English in the home.

It cannot be repeated too often, that the Survey results were from a very small sample of ACT residents and are very dated (conducted 6-7 years ago). The sample was so small in fact, that results for diabetes could not be interpreted accurately for the ACT (high sampling error of estimates). The 1995-96 National Health Survey is currently being undertaken with a considerably enlarged ACT sample. More data on ACT status can therefore be expected to be available. It will be interesting to compare the results with those of the 1989-90 Survey.

3.3 *Third National Survey of Morbidity in General Practice in Australia*

This survey, conducted by Bridges-Webb and colleagues in 1990-91 and supported by the National Health and Medical Research Council gives an indication of general practice utilisation by people with diabetes (amongst other conditions)²⁰. The ACT data obtained were weighted to provide sufficient data for individual analysis.

Of the 145,799 problems encountered by GPs in the survey *in Australia*, 1.3 per cent were specifically for diabetes mellitus. This equates to 1.9 out of every 100 encounters. Diabetes was the 13th most common problem seen.

Results for the *ACT* showed 5761 encounters, with diabetes being the 14th most common specific reason for contact (rate of 2.0 per 100 encounters). This does not include such classifications as foot and toe problems, hypertension, heart problems, eye problems and so on which may be associated with a diabetes condition, so the results can be interpreted as conservative.

It should be noted that there are some questions as to the validity of the sample design of the Survey so results should not be accepted in isolation.

3.4 Hospital morbidity

It is not easy to gauge the incidence of diabetes, since most people are diagnosed and treated by their general practitioner and data concerning these visits is not extensive. Hospital separation data will give an indication of acute occurrences of the disease however.

3.4.1 Separations

There were 1689 separations from ACT hospitals for diabetes mellitus related episodes, for the financial year 1993-94. This includes diabetes as a secondary cause. Since there were 64,416 separations for all causes, diabetes accounted for 2.6 per cent of hospital separations in 1993-94.

Table 4: Estimated number of hospital separations for principal or secondary diagnosis of diabetes, by age, ACT, 1993-94

Selected diagnosis of diabetes	Age (years)									Total
	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75+	
Diabetes:										
- without mention of complication	1	12	22	26	56	133	241	359	332	1182
- with ketoacidosis	8	8	23	5	4	8	1	5	-	62
- with hyperosmolarity	-	-	-	-	-	-	1	-	-	1
- with other coma	1	1	1	2	-	1	-	-	3	9
- with renal manifestations	-	-	-	2	2	12	15	21	1	53
- with ophthalmic manifestations	-	-	-	3	1	1	3	9	5	22
- with neurological manifestations	-	-	-	4	17	3	2	12	3	41
- with peripheral circulatory disorders	-	-	-	-	5	6	29	47	21	108
- with other specified manifestations	-	1	2	1	1	4	4	5	4	22
- with unspecified complication	3	16	17	14	17	25	28	30	39	189
Total	13	38	65	57	103	193	324	488	408	1689*

* excludes one female of unknown age

NB. excludes gestational diabetes (648.8), hyperglycemia (790.6), neonatal diabetes mellitus (775.1), nonclinical diabetes (790.2) and diabetes complicating pregnancy, childbirth, or the puerperium (648.0)

From the table above it can be seen that there was a small peak of incidence at 15-24 years, and that people aged 35 onwards have progressively more hospital separations for diabetes related reasons.

Of the 1390 separations where diabetes was the secondary diagnosis, major principal diagnoses were diseases of the circulatory system (31%), diseases of the digestive system (12%), neoplasms (10%), injury and poisoning (7%), diseases of the nervous system and sense organs (6%), diseases of the genitourinary system (6%) and diseases of the musculoskeletal system and connecting tissue (6%). Of these percentages, diseases of the circulatory system, are significantly higher, and diseases of the nervous system and sense organs a slightly higher, than the general percentages for all causes of separations for ACT hospitals.

Separations specifically related to diabetes as the principal cause numbered 299:

Table 5: Estimated number of hospital separations for principal diagnosis of diabetes, by age, ACT, 1993-94

Selected diagnosis of diabetes	Age (years)									Total
	1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75+	
Diabetes:										
- without mention of complication	-	6	1	2	3	3	6	7	-	28
- with ketoacidosis	8	7	22	5	4	6	1	5	-	58
- with hyperosmolarity	-	-	-	-	-	-	1	-	-	1
- with other coma	1	1	1	2	-	1	-	-	3	9
- with renal manifestation	-	-	-	-	-	3	6	4	-	13
- with ophthalmic manifestations	-	-	-	1	-	-	1	3	3	8
- with neurological manifestations	-	-	-	3	14	1	1	3	1	23
- with peripheral circulatory disorders	-	-	-	-	3	1	14	20	7	45
- with other specified manifestations	-	-	2	-	-	3	2	3	1	11
- with unspecified complication	3	11	16	7	9	10	13	17	17	103
Total	12	25	42	20	33	28	45	62	32	299

NB. excludes gestational diabetes (648.8), hyperglycemia (790.6), neonatal diabetes mellitus (775.1), nonclinical diabetes (790.2) and diabetes complicating pregnancy, childbirth, or the puerperium (648.0)

Table 6 gives a profile of the age breakdown and types of diabetes treated in hospitals in the Territory. 62 per cent of cases were NIDDM and the older age groups were hospitalised considerably more frequently than the younger age groups.

Table 6: Estimated number of hospital separations for principal or secondary diagnosis of diabetes, by type, by sex, by age, ACT, 1993-94

Diabetes type	Sex	Age groups (years)									Total
		1-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75+	
NIDDM	male	0	0	4	5	14	70	127	205	138	563
	female	0	0	0	1	27	46	98	137	183	492
	Subtotal	0	0	4	6	41	116	225	342	321	1055
IDDM	male	9	18	27	26	19	42	54	81	39	315
	female	4	20	34	25	43	35	45	65	48	319
	Subtotal	13	38	61	51	62	77	99	146	87	634
All diabetes	male	9	18	31	31	33	112	181	286	177	878
	female	4	20	34	26	70	81	143	202	231	812*
	Total	13	38	65	57	103	193	324	488	408	1690

* includes one female of unknown age NB. excludes gestational diabetes (648.8), hyperglycemia (790.6), neonatal diabetes mellitus (775.1), nonclinical diabetes (790.2) and diabetes complicating pregnancy, childbirth, or the puerperium (648.0)

3.4.2 Re-admissions

To a certain extent, the efficacy of diabetes management plans can be evaluated by considering the levels of re-admissions to hospital.

Table 7: Number of hospital separations per individual, for principal or secondary diagnosis of diabetes, ACT, 1993-94

No. of separations per individual	No. of individuals	Total separations
1	937	937
2	181	362
3	60	180
4	20	80
5	11	55
6	7	42
9	2	18
16	1	16
Total	1219	1690

The above figures indicate that 45 per cent of patients returned for at least a second admission to hospital in the one year. It is important to gauge whether they returned for diabetes management or diabetes related conditions management (eg cardiovascular problems), or an unrelated condition. Table 8 outlines the patients who were separated for a principal diagnosis of diabetes:

Table 8: Number of hospital separations per individual, for principal diagnosis of diabetes, ACT, 1993-94

No. of separations per individual	No. of individuals	Total separations
1	216	216
2	22	44
3	1	3
4	4	16
5	1	5
15	1	15
Total	245	299

More than 88 per cent of people separated for principal diagnosis of diabetes, had only one separation. Conversely, less than 12 per cent of people with principal diagnosis of diabetes returned for more than one separation from hospital. It can be inferred therefore, that most people with diabetes are stabilised in their single visit to hospital and do not require further admissions during one year. The utilisation of the outpatient clinic and general practitioners in the on-going management of diabetes after the initial visit to hospital will have had considerable impact on the need for future hospitalisation.

If you consider separations over a three year period (July 1991 to June 1994), 68 per cent of individuals with a principal or secondary diagnosis of diabetes had only one separation and over 81 per cent of individuals with a principal diagnosis of diabetes had only one separation. This strengthens the inference that most people with diabetes are stabilised in a single admission, and do not require re-admission in a three year period.

Of the separations, 12 people with principal diagnosis of diabetes separated due to death and 161 people with secondary diagnosis of diabetes separated due to death.

3.4.3 Average length of stay

The average length of stay in hospital was 11.0 days for males and 10.0 days for females in 1993-94. This is a very high rate compared to most other causes. Males tend to stay in hospital longer than females for both types of diabetes.

Table 9: Number of hospital separations for principal or secondary diagnosis of diabetes, by type, by sex, by length of stay, ACT, 1993-94

Diabetes type	Length of Stay (days)								ALOS*	MDN*
	0	1	2	3	4-7	8-14	15-34	35+		
NIDDM										
male	43	42	65	42	123	142	73	33	11.5	6.0
female	39	37	49	47	134	91	62	34	10.6	6.0
IDDM										
male	20	30	34	31	88	50	40	22	10.0	5.0
female	26	30	37	34	86	58	39	9	9.0	5.0
Total	128	139	185	154	431	341	214	98	10.5	6.0

NB. excludes gestational diabetes (648.8), hyperglycemia (790.6), neonatal diabetes mellitus (775.1), nonclinical diabetes (790.2) and diabetes complicating pregnancy, childbirth, or the puerperium (648.0)

*ALOS = average length of stay, MDN=median length of stay. In ALOS and MDN, same day patients counted as one day.

3.4.4 Gestational diabetes, complications of pregnancy and childbirth

Of the 4,841 births at ACT hospitals during 1993-94, there were 113 women separated (involving 101 individuals) with gestational diabetes mellitus. Most of these separations were for the confinement of their babies only. The ALOS was 5.8 days.

For the 26 women having complications in pregnancy (involving 22 individuals), childbirth or the puerperium due to diabetes, the ALOS was 9.1 days.

Table 10: Number of hospital separations for principal or secondary diagnosis of gestational diabetes, complications of pregnancy or childbirth due to diabetes, ACT, 1993-94

	Age groups			Total
	15-24	25-34	35-44	
Gestational diabetes	7	73	33	113
Complications of preg/ch.birch/ puerperium	9	14	3	26

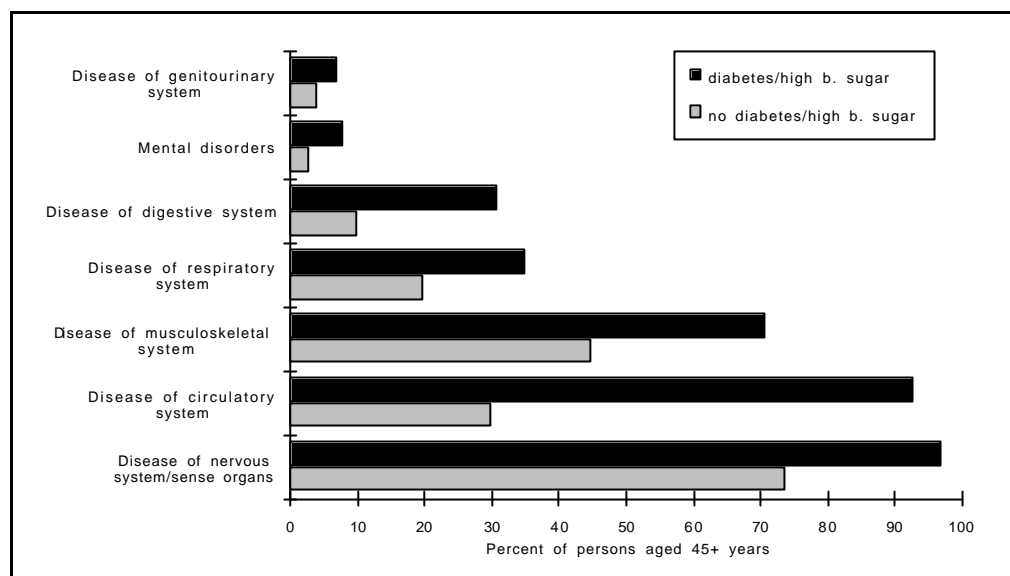
3.5 Disability and/or reduction in quality of life caused by diabetes

There is a clear association between diabetes and certain other long-term conditions which can cause reduction in health and quality of life. People with diabetes tend to have a higher prevalence of eyesight and hearing problems, musculoskeletal, respiratory and digestive conditions, and in particular, conditions of the circulatory system, than people without diabetes. Such prevalence could give an estimate for proxy quality of life indicators.

3.5.1 National Health Survey 1989-90

The National Health Survey 1989-90 found that, for people over 45 years of age, the difference in prevalence of long-term conditions, between those with and those without diabetes or high blood sugar levels, was quite high:

Figure 3: Persons aged 45 yrs or more with and without diabetes or high blood sugar, by reported long-term conditions, Australia, 1989-90



Source: National Health Survey, 1989-90, Diabetes Australia, Catalogue 4371.0

It can be seen that the difference is considerable, especially for diseases of the circulatory system. Of those people over 45 years of age with diabetes or high blood sugar levels, 42.6 per cent also reported having long-term hypertension and 18.4 per cent reported having heart disease. (People without diabetes or high blood sugar levels reported 19.2 per cent and 4.9 per cent respectively).

The National Health Survey 1989-90 also found that people over the age of 15 years with diabetes or high blood sugar levels were more likely to be overweight or obese than the population overall.

People with diabetes aged 45 to 64 years tended to visit the doctor considerably more than younger people with diabetes.

3.5.2 Other research

A study conducted in the Netherlands by Nusselder and colleagues (1988) using the Dutch National Survey of General Practice (1987-88) and mortality data from the Dutch Central Bureau of Statistics to obtain disability-free life expectancy (DFLE), gives controversial insight into levels of disability to be expected in people with diabetes¹⁴.

The study found that, there was little impact on DFLE by 'eliminating' diabetes. For women, there was a small increase in total life expectancy accompanied by a larger increase in disability-free life expectancy. There was no statistically significant impact on DFLE on men with diabetes.

One possible reason for these results which differ considerably from other research, is that diabetes is not evenly distributed across society as this study implies, but affects particular groups at risk (such as Aborigines and Torres Strait Islanders, and people from low socio-economic backgrounds).

The **World Health Organisation** on the other hand, is convinced that diabetes prevention *and* control have a significant impact on the reduction of human suffering (and financial cost)⁵. Appropriate management strategies reduce the risk of serious associated conditions such as amputations caused by poor circulation.

The **Diabetes Control and Complications Trial (DCCT)**, which is highly regarded amongst health professionals as being a quality longitudinal study, was conducted by the DCCT Research Group

representing a large number of National Institutes and individuals in the USA. The trial was a multi-centre, randomised clinical trial of 1441 patients who were recruited from 29 Centres over the period 1983 to 1989. Results offered clear evidence of the central role of diabetes educators and health care teams in implementing intensive management to produce outcomes of improved blood glucose control. Such intensive intervention and education of patients to self-manage their disease resulted in marked reductions in complications caused by diabetes. The study results showed a 76 per cent reduction in the incidence of new onset retinopathy, 54 per cent reduction in the incidence of albuminuria (and hopefully, of consequent renal failure), 60 per cent reduction in the incidence of neuropathy and a 41 per cent reduction in the incidence of macrovascular disease in patients with insulin dependent diabetes mellitus.^{18, 19}. The study recommended that patients with NIDDM could also benefit greatly by such a regime of intensive, closely monitored intervention as used in the Trial.

4. Diabetes management strategies

4.1 Medical Outpatients Clinic, Woden Valley Hospital

The centre is part of the Endocrinology Department of the hospital and is accredited by the National Association of Accredited Diabetes Centres and is linked to the NSW Association. It operates on the philosophy espoused by the American Association of Diabetes Educators after it had completed many years research in the Diabetes Control and Complications Trial:

- that achieving better glycaemic control depends upon greater access to quality diabetes education from a variety of health professionals and
- that patients must be encouraged to assume more individual responsibility and become empowered to be the leading member of their diabetes self-management planning team^{17,18}.

It also believes that the strengthening and maintenance of its ambulatory care program will assist in ensuring that people with diabetes will be admitted or re-admitted to hospital at a reduced level.

People are usually referred to the Clinic by hospital staff or general practitioners, for medical assessment, stabilisation and often, on-going management of their disease. Annual full medical assessments are encouraged to ensure that clients remain stable in the management of their diabetes. The Clinic has two endocrinologists, an endocrinology registrar and four diabetes educators and other paramedics on staff. They have access to hospital dietitians, social workers and psychologists. Approximately 1,200 patients with diabetes are seen each year. These are predominately insulin dependent patients or patients with established complications of the condition.

Services provided include:

- an ambulatory care centre where new patients are medically assessed, individual intervention programs are designed, and patients assisted in managing their programs;
- education of hospital staff and patients (group and individual sessions - eg a children's clinic for young patients with Type 1 diabetes is held once a month);
- educational up-dates for regional GPs, nursing staff and other health professionals to assist continuity of care and appropriate co-ordination;
- on-going clients are encouraged to participate in annual medical reviews and education sessions;

- an after hours intervention service where an endocrinologist and diabetes educator are on 24 hour call to assist clients in times of crisis. This service, mainly offered by telephone contact, assists clients in overcoming urgent symptoms through telephone counselling and monitoring, and reduces the need for clients to be admitted to hospital. A recent case-mix exercise estimated that approximately 6400 telephone occasions of service are made each year;
- assess and assist in the management of women with gestational diabetes (about 130 per year);
- provide a podiatry service for clients which has significant impact on reducing serious foot problems and the need for amputations;
- teaching role for medical students, graduate students and paramedical staff;
- a consultation service on diabetes and its management is provided to other specialists who have patients with diabetes in hospital for reasons other than their diabetes to ensure that patients are discharged as early as possible with as little disruption to their metabolic state as possible;
- conduct school visits to educate teaching staff in relation to individual students with diabetes;
- produce educational leaflets on various aspects of diabetes management for use by patients and health professionals;
- conduct on-going research into the prevention and control of diabetes - this currently includes collaboration with the Division of Molecular Medicine at John Curtin School of Medicine and the Vascular and Thrombosis Research Unit at WVH;
- keep comprehensive records on clients with diabetes, especially those with gestational or childhood diabetes. When resources allow, it is envisioned that a data base will be more regularly up-dated for epidemiological analysis.

4.2 ACT Division of General Practice Diabetes Project

A project which commenced in 1995 and funded by the Commonwealth Department of Health and Family Services, is being undertaken by the ACT Division of General Practice. It aims to strengthen the role of GPs in the care of people with diabetes using a primary health care approach, to identify diabetes knowledge and risk factors in the local area and to develop a broader network of support by improving co-ordination amongst the range of services, and to develop best practice protocols for health gain across the public health continuum. It will establish a central database of diabetics which will assist in developing a more accurate profile of diabetes incidence and treatment in the ACT.

Activities undertaken by the project include:

- publication of a monthly newsletter to provide GPs, specialists and allied health professionals with project information, information on services available in the treatment of diabetes, current treatment protocols, advances in knowledge about diabetes and its treatment and information on seminars/workshops on diabetes held in the region;
- a survey of 300 GPs in the Division (with a response rate of 80 per cent) to identify gaps in services, and GP and client needs and gaps. Doctors noted the need for strengthened co-ordination of diabetes service delivery and ongoing education and expressed a willingness to contribute;
- a survey of Diabetes Educators and meetings with health professionals identified similar needs for best patient care and complication prevention;

- a two day certified diabetes course and seminar on GP management of childhood diabetes;
- development of a poster on risk factors, patient information pamphlets, talks by GPs to community groups, newspaper articles and a radio interview about the role of GPs in the management of diabetes;
- conducted health promotion campaigns with Diabetes Australia ACT during 'Family Doctor Week' and 'Diabetes Week' ;
- developed protocols on early detection, management and complication prevention in diabetes management which are now being utilised;
- developed and trialled a patient held diabetes record which will be utilised soon.

4.3 ACT Health Goals and Targets for the Year 2000

The ACT Health Goals and Targets for the Year 2000 document outlines some specific goals for improving diabetes services:

- to reduce the prevalence of non-insulin dependent diabetes;
- to achieve early diagnosis of diabetes so that early intervention can assist in reducing the prevalence and severity of diabetes-related complications; and
- to obtain accurate baseline data about the prevalence and health outcomes associated with diabetes.

A working party to address the issues will be established as part of the ACT Goals and Targets and health outcomes process. Membership will include experts, departmental officers, non-government organisational people and consumers.

4.4 National Action Plan - Diabetes - To the year 2000 and beyond

This plan for the prevention and control of non-insulin dependent diabetes mellitus in Australia was released by the Australian Diabetes Society in 1993. Refer Appendix 2.

4.5 Collection of accurate data

The implementation of health goals and targets and the maintenance and improvements to service delivery will depend in part on the availability of quality base-line data on which to base evaluations of programs and interventions.

4.5.1 ACT Hospital Morbidity Collection

The ACT Department of Health and Community Care has a comprehensive collection of separation data for ACT hospitals. This is maintained by the Performance Information Section.

In addition, the ACT Department, with assistance from the Commonwealth Government Ambulatory Care Reform initiatives, has developed a comprehensive data collection project which will strengthen improvements in the collection of accurate outpatient clinic statistics from Woden Valley and Calvary hospitals. This will assist in enhancing knowledge about diabetes (and other disease) incidence in the Territory.

The data collection system has been installed and will be operational shortly. It is compatible with the new NSW data system, thus allowing cross border comparisons. It will utilise the National Injury Surveillance data definitions and national emergency definitions currently being developed.

4.5.2 The National Health Survey

The National Health Survey, which is conducted every five years, is another excellent source of information. This will be particularly so for the 1995-96 survey, since the ACT had negotiated an extended ACT sample to ensure greater accuracy.

4.5.3 The ACT Care Continuum and Health Outcomes of Hospital Inpatients Project

An innovative method for collecting data is the *ACT Care Continuum and Health Outcomes of Hospital Inpatients Project*.²¹ This is a two year pilot project, funded by the Commonwealth Department of Health and Family Services, which commenced in early 1995 and is being undertaken by the Epidemiology Unit of the ACT Department of Health and Community Care in collaboration with The Australian National University. The project involves investigating approximately 7,000 inpatients and their experiences prior to admission, during their hospital stay and up to six months after discharge. Questions regarding formal and informal service utilisation, costs across the care continuum and how to make better use of resources, and health outcomes including quality of life are being addressed. Data are collected through an interview questionnaire, a diary maintained by the patient and self-completion questionnaires complemented by existing data bases. The information collected will allow for the development of a profile of patient care and outcomes on which to base future planning for the enhancement of quality of care and relevance of health interventions.

5. References

1. ACT Department of Health, *ACT Health Goals and Targets for the Year 2000*, 1994
2. Australian Bureau of Statistics, unpublished data, *Causes of Death, Australia, 1991-94*, Catalogue No. 3303.0
- 2(a) Australian Bureau of Statistics, *Causes of Death, Australia, 1991-94*, Catalogue No. 3303.0
3. Nutbeam D, Thomas M, Wise M, *National Action Plan - Diabetes to the Year 2000 and Beyond*, Australian Diabetes Society (Diabetes Australia), Canberra, 1993
4. ABS, *Population Survey Monitor*, February 1994, Catalogue No. 4103.0
5. WHO Technical Report Series, *Prevention of diabetes mellitus*, Report of a WHO study group, Geneva, 1994
6. Zimmet P, Cohen M, *The diabetes epidemic in Australia: prevalence, patterns and public health*, Medical J of Australia, Vol 163, August 1995
7. National Health Strategy research paper No. 1, *Enough to make you sick*, 1992
8. Bhatia K, Anderson P, *An overview of Aboriginal and Torres Strait Islander health: present status and future trends*, AIHW, 1995
9. Wellborn A, Knuiman M, Bartholomew H, Whittall D, *1989-90 National health Survey: prevalence of self-reported diabetes in Australia*, Medical J of Australia, Vol 163, August 1995
10. Gilbert C, White U, *ACT's Health: A report on the health status of ACT residents*, ACT Department of Health and Community Care, Health Series No. 1, October 1995
11. ABS, *Australian Social Trends 1994*, Catalogue No. 4102.0
12. ABS, *Deaths Australia 1994*, Catalogue No. 3302.0
13. ABS, *1989-90 National Health Survey, Diabetes, Australia*, Catalogue No. 4371.0
14. Nusselder WJ, van der Velden J, Lenior ME, van Sonsbeek JLA, van den Bos GA, *The effect of elimination of selected chronic diseases on disability-free life expectancy: compression or expansion of morbidity? Preliminary results*, in *Advances in health expectancies*, Proceedings of the 7th Meeting of the International Network on Health Expectancy, Canberra February 1994, AIHW, 1994
15. Horton ES, *NIDDM - the devastating disease*, Diabetes-Res-Clin-Pract. August:28 Suppl: S3-11, 1995
16. Meadows P, *Variation of diabetes mellitus prevalence in general practice and its relation to deprivation*, Diabet-Med. August; 12(8): 696-700, 1995
17. Fain JA, *Editorial: DCCT; Model of Partnerships*, The Diabetes Educator, Jan/Feb Vol 20, No 1, 1994
18. *AADE Position Statement: Diabetes Control and Complications Trial (DCCT)*, The Diabetes Educator, Mar/Apr, Vol 20, No 2, 1994
19. Diabetes Control & Complications Trial (DCCT) Research Group, *Effect of intensive treatment of diabetes on the development and progression of long-term complications*, N England J of Medicine, 329 (14): 977-86, 1993
20. Bridges-Webb C, Britt H, Miles DA, Neary S, Charles J, Traynor V, *Morbidity and treatment in general practice in Australia 1990 - 1991*, Medical J of Australia, Supplement, Oct 1992
21. Shadbolt B, *The Care Continuum and Health Outcomes Project: The Research Plan*, ACT Dept of Health & Community Care, Canberra, 1995

6. Glossary

Age-sex standardisation - demographic technique for adjusting for the effects of age and sex between populations which allows comparisons between populations.⁴

Age-sex standardised ratio - The expected number of events is given by calculating the number of events which would have occurred if the rates for each age/sex group in a given population (the standard) were applied to the population of interest.³

Crude death rate is the number of deaths per 1,000 population (unless otherwise stipulated) in a given year.⁴

Incidence refers to the number of instances of illness commencing, or of persons falling ill, during a given period in a specified population.¹

Median is a measure of central tendency. It refers to the point between the upper and lower halves of the set of measurements.¹

Mortality is the relative number of deaths, or death rate, as in a district or community.²

Morbidity is the proportion of sickness in a locality.²

Potential Years of Life Lost (PYLL) is a measure of the relative impact of various diseases and lethal forces on society. PYLL highlights the loss to society as a result of youthful or early deaths. The figure for PYLL due to a particular cause is the sum, over all persons dying from that cause, of the years that these persons would have lived had they experienced normal life expectation.¹

Prevalence refers to the number of instances of a given disease or other condition in a given population at a designated time.¹

Separation (from hospital) refers to when a patient is discharged from hospital, transferred to another hospital or other health care accommodation, or dies in hospital following formal admission.⁴

Sex differentials are the differences in rates between males and females.¹

Standardised death rate is the overall death rate that would have prevailed in a standard population, in this case the 1991 Australian population, if it had experienced at each stage the death rates of the population being studied.⁴

Statistically significant infers that it can be concluded on the basis of statistical analysis that it is highly probable.

References

1. Last J, *A Dictionary of Epidemiology*, IEA, 1988
2. Delbridge A, Bernard JRL, *The Macquarie Concise Dictionary, 2nd Edition*, 1988
3. Glover J, Woollacott T. *A Social Health Atlas. ABS Catalogue No. 4385.0*, 1992.
4. Australian Bureau of Statistics definitions.

Appendix 1: Limitations in developing a diabetes mellitus profile

Developing a profile on diabetes is not easy. Some of the problems are:

- Classification of diabetes, where diagnosis is often delayed, is not easy. No symptoms or non-severe symptoms may be present for years before a person is diagnosed as having diabetes, making it a 'hidden disease'.
- Comprehensive data are not readily available;
- What data are available, generally record small numbers of occurrences of particular events. The smaller the numbers, the more likely it is to have inexplicable fluctuations in results. Where changes in pattern from year to year are noted, time series are utilised to ensure a more reliable analysis;
- There could be inconsistencies in recording of cause of death (eg. a person may be recorded as dying from heart attack rather than from the diabetes which caused cardiovascular weaknesses);
- There may also be inconsistencies in coding hospital admissions (eg. a person may be coded as having a heart attack as the principal diagnosis, but it may have been caused by diabetes - a different coder may have coded principal diagnosis as "diabetes" with the heart attack as the secondary diagnosis);
- In many cases, especially non-acute cases, people treat themselves or seek treatment from outside the hospital system (eg medical practitioner, podiatrist, pharmacist). There are no structured mechanisms for recording these occurrences. The recent project conducted by the ACT Division of general practice (Refer section 4.2) will assist in estimating some of these contacts.

1989-90 National Health Survey

The Australian Bureau of Statistics (ABS) 1989-90 National Health Survey collected data from approximately 54,000 people living throughout Australia. The sample was designed so that the states and territories could be separately analysed. However:

- Until the 1995-96 survey, the sample size of respondents was very small in the ACT. This resulted in fluctuations in results and reduced reliability of findings. When responses were broken down into sub-groups (eg people aged under 18), the sample became even smaller resulting in more inaccuracies. It should also be noted that the Survey utilises a self-reporting format. Results represent respondents' perceptions, not necessarily health professionals' findings. It also depends in part, on the literacy of the respondents and their ability to understand English.
- Since the last Survey was conducted in 1989-90, results are quite out-dated and should be interpreted with caution.

Appendix 2: Diabetes Australia activities

Diabetes Australia

Diabetes Australia is the national co-ordinating body for the diabetes movement in Australia and is composed of twelve member organisations including:

- an Association in each capital city representing consumers and providing advocacy, group support, education, consumer products and related training services;
- a medical and scientific section (the Australian Diabetes Society);
- an education advisory section (the Australian Diabetes Education Association); and
- diabetes research involving several diabetes research trusts.

National Action Plan - Diabetes - To the year 2000 and beyond

This plan for the prevention and control of non-insulin dependent diabetes mellitus in Australia was released by the Australian Diabetes Society in 1993. It has nine goals and 75 targets which are complementary to those outlined in *Goals and Targets for Australia's Health in the Year 2000 and Beyond*.

The goals of the plan are:

- to obtain accurate data on the prevalence and incidence of NIDDM in the Australian population by 1995;
- to reduce the prevalence of NIDDM;
- to reduce the prevalence of NIDDM in Aboriginal and Torres Strait Islander populations;
- to reduce the prevalence of NIDDM in the migrant populations in Australia that have high prevalence of the disease, including those from Southern Europe, the Middle East and South-East Asia, and among Polynesians and Asian Indians;
- to achieve early diagnosis of NIDDM;
- to obtain accurate data on the prevalence and incidence of complications of NIDDM among persons in Australia who have NIDDM;
- to reduce the prevalence and incidence of complications of NIDDM;
- to reduce the prevalence and incidence of end-stage complications of NIDDM, especially lower limb amputations, kidney failure and blindness;
- to increase the quantity and maintain or improve the quality of research in the prevention and management of NIDDM, particularly in those areas where fundamental information is lacking.

One recent result of addressing the above goals was the commissioning of research into the epidemiology and costs of diabetes mellitus in Australia. A report *The rise and rise of diabetes in Australia, 1996* was released in April 1996. It outlines current knowledge about the disease, its incidence and prevalence in Australia, and suggests a national action plan for diabetes to the year 2000.

Health Series Publications

The Epidemiology Unit of the Department of Health and Community Care has developed an on-going health series of publications to inform health professionals, policy developers and the community on health status in the Territory. Information contained therein will assist in the development of appropriate policy and service delivery models, the evaluation of programs, and an understanding of how the ACT compares with Australia as a whole with regard health status.

Number 1: *ACT's Health: A report on the health status of ACT residents*,
Carol Gilbert, Ursula White, October 1995

Number 2: *The Epidemiology of Injury in the ACT*,
Carol Gilbert, Chris Gordon, February 1996

Number 3: *Cancer in the Australian Capital Territory 1983-1992*,
Norma Briscoe, April 1996

Number 4: *The Epidemiology of Asthma in the ACT*,
Carol Gilbert, April 1996

Number 5: *The Epidemiology of Diabetes Mellitus in the ACT*,
Carol Gilbert, Chris Gordon, July 1996

Future imminent publications are being planned for cancer services strategic planning (nearing completion), stroke and cardiovascular disease.