Preliminary Study of the Economic Cost of Diabetes in South Australia

July 2007

Michael Burke
Catherine Chittleborough
Anne Taylor
Tiffany Gill
Patrick Phillips

Population Research and Outcome Studies
Health Intelligence
South Australian Department of Health
<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXECUTIVE SUMMARY</td>
<td>EXECUTIVE SUMMARY</td>
<td>1</td>
</tr>
<tr>
<td>CHAPTER 1: INTRODUCTION</td>
<td>CHAPTER 1: INTRODUCTION</td>
<td>3</td>
</tr>
<tr>
<td>1.1 Background</td>
<td>1.1 Background</td>
<td>4</td>
</tr>
<tr>
<td>1.2 Aim</td>
<td>1.2 Aim</td>
<td>5</td>
</tr>
<tr>
<td>CHAPTER 2: METHODS</td>
<td>CHAPTER 2: METHODS</td>
<td>7</td>
</tr>
<tr>
<td>2.1 Data Sources</td>
<td>2.1 Data Sources</td>
<td>8</td>
</tr>
<tr>
<td>2.2 Data Processing</td>
<td>2.2 Data Processing</td>
<td>9</td>
</tr>
<tr>
<td>2.3 COI Model</td>
<td>2.3 COI Model</td>
<td>10</td>
</tr>
<tr>
<td>2.4 Prevalence of Diabetes</td>
<td>2.4 Prevalence of Diabetes</td>
<td>12</td>
</tr>
<tr>
<td>CHAPTER 3: RESULTS</td>
<td>CHAPTER 3: RESULTS</td>
<td>13</td>
</tr>
<tr>
<td>3.1 Direct Medical Cost Component Values</td>
<td>3.1 Direct Medical Cost Component Values</td>
<td>14</td>
</tr>
<tr>
<td>3.2 Direct Non Medical Cost Component Values</td>
<td>3.2 Direct Non Medical Cost Component Values</td>
<td>19</td>
</tr>
<tr>
<td>3.3 Indirect Cost Component Values</td>
<td>3.3 Indirect Cost Component Values</td>
<td>20</td>
</tr>
<tr>
<td>3.4 Total Cost</td>
<td>3.4 Total Cost</td>
<td>24</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>REFERENCES</td>
<td>25</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

This Cost of Illness (COI) study utilised a range of South Australian data sources, including representative population surveys and routine Australian Bureau of Statistics collections, to estimate the economic cost of diabetes, and the average cost per person with diabetes for the year 2000.

The economic impact of diabetes in South Australia in 2000 was estimated to be approximately $246 million, of which 88.5% were direct costs and 11.5% were indirect costs. Direct medical costs, including hospital related costs, and those associated with Medicare Benefits Schedule and Pharmaceutical Benefits Scheme, Diabetes Nurse Educators, Dieticians, and Podiatrists averaged $1732 per person with diabetes in 2000. Non medical direct costs, including costs associated with equipment and consumables, physical activity, and special diets, averaged $1860 per person with diabetes. The cost of carers was the major contributor to indirect costs, at $465 per person with diabetes in 2000.

The overall cost of diabetes obtained in this study is likely to be an underestimate as several elements were unable to included in the model. The COI model only included the costs associated with diabetes among adult South Australians. Costs associated with diabetes among younger people remain a gap in available data. In addition, costs associated with 'over the counter' medications for the management of diabetes, transport attributable to diabetes, reduced productivity of people with diabetes who remain in the workforce, and research into diabetes were excluded from the model.

The high economic costs associated with diabetes helps build the case for continued and improved management of the condition, and particularly for the reduction of the incidence of diabetes through prevention programs and interventions.
CHAPTER 1: INTRODUCTION
1.1 Background

Diabetes Mellitus is a chronic condition that is a National and South Australian Health Priority.\textsuperscript{1,2} This is due both to the number of South Australians who currently have diabetes and to the increasing trend in the prevalence of diabetes.\textsuperscript{3} A Cost of Illness (COI) study has been undertaken to estimate the economic impact of diabetes in South Australia, and to assist with future studies which will provide a more complete analysis for strategic planning purposes.

COI studies are an attempt to estimate the economic impact of the presence of a disease or condition upon a given society or group from a given perspective. Over time, a standard protocol has developed which is generally followed by COI studies. The cost of an illness is made up of three high level broad cost components:

- **Direct Costs** are those costs that are clearly and directly attributable to the condition in question. This commonly includes medical costs, such as hospital, medical professional and pharmaceutical costs, as well as non-medical costs, which may include transport, carers and lifestyle change costs.

- **Indirect Costs** are imputed costs used to reflect the impact to production caused by an illness. The inclusion of indirect costs is a much debated practice. Depending on the viewpoint taken for the COI, indirect costs may have more or less relevance. When costing from a societal perspective, indirect costs are applicable, as changes in society’s production, and therefore consumption and utility are being estimated.

- **Intangible Costs** estimate the cost of an illness in terms of the reduction in quality of life caused. This reduction may manifest itself as pain, anxiety, disability or suffering. As Intangible Costs do not have any resource impact \textit{per se}, they are not generally included in a COI study.

A COI study allows the identification and analysis of how resources were allocated between different factors in the reference period. However, the estimate provided by a COI study is based upon the aggregation of average costs. It is an estimate of the total economic cost attributable to a condition for a specified period. A high COI does not necessarily indicate that further resources should be allocated to the treatment of a particular condition, nor does a low COI imply that no significant benefit would be gained by allocating more resources to the treatment of a condition.
1.2 Aim

The objective of this study is to provide a preliminary estimate of the economic cost to South Australia of diabetes in 2000 using the cross sectional prevalence method, (rather than the longitudinal incidence method) and in the process identify gaps in our current knowledge. A conservative approach has been taken when estimating individual cost components, to reduce the risk of over estimation and ‘sensationalising’ the impact of diabetes.
CHAPTER 2: METHODS
The majority of the data used in this study were provided by the Population Research and Outcomes Studies Unit, South Australian Department of Health. More specifically, the following data sources were utilised.

- **The North West Adelaide Health Study (NWAHS)** is a biomedical survey of adult (18+) people living in the North West region of Adelaide. The data collected include various biomedical measurements, service utilisation and socio-demographic characteristics. The NWAHS also includes a data linkage with the Health Insurance Commission (HIC) Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS) rebates paid for participants over a five year period.

- **The Social and Environmental Risk Context Information System (SERCIS)** is a computer assisted telephone interview (CATI) survey system in which South Australian telephone numbers are randomly selected from the electronic white pages telephone number listing.

- **The Health Monitor Survey** is a computer assisted telephone interview with the same methodology as SERCIS, but allows the opportunity for user pays questions to be included.

- The estimates of South Australian population, mortality, inflation, and average weekly earnings calculated by the Australian Bureau of Statistics were also utilised.

As the COI is for the calendar year 2000, ideally all data used would be from this period. However, not all of the data required to produce a reasonable estimate were gathered in the year 2000. Where required data had been collected in a different period, these data were used, after appropriate adjustments had been made to allow year 2000 estimates. Some data required to provide a reasonable estimate had not been collected at all in the past, where feasible these data were collected during the course of the study.
2.2 Data Processing

2.2.1 Analysis

Data were analysed using SPSS Version 10.0. The conventional five per cent level of statistical significance was used to determine statistically significant differences.

2.2.2 Weighting

South Australian population data were weighted by age, gender, area of residence and probability of selection in the household so that the sample was representative.

2.2.3 Data interpretation

Costs are presented in Australian Dollars for the year 2000.
2.3 COI Model

2.3.1 COI Model Inclusions

Table 2.1 outlines the individual cost components that factor in the COI model. These components represent the costs that were thought likely to be significant, and were accessible for this study. This is not an exhaustive list of all the factors that contribute to the cost of diabetes. The total cost and average cost per person with diabetes was calculated for each these components and summed to produce a total economic cost of diabetes, and the average cost per person with diabetes for the year 2000.

Table 2.1: Cost Components of COI Model

<table>
<thead>
<tr>
<th>Direct Costs (Medical)</th>
<th>Hospital Related Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MBS Rebates Claimed</td>
</tr>
<tr>
<td></td>
<td>PBS Rebates Claimed</td>
</tr>
<tr>
<td></td>
<td>Diabetes Nurse Educator Costs</td>
</tr>
<tr>
<td></td>
<td>Dieticians</td>
</tr>
<tr>
<td></td>
<td>Podiatrists</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Direct Costs (Non Medical)</th>
<th>Cost of Equipment/ Consumables used in management of diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cost of additional Physical Activity for management of diabetes</td>
</tr>
<tr>
<td></td>
<td>Additional costs of special diet consumed in management of diabetes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indirect Costs</th>
<th>Cost of Carer for people with diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short Term Labour Loss due to diabetes</td>
</tr>
<tr>
<td></td>
<td>Permanent Labour Loss due to diabetes</td>
</tr>
</tbody>
</table>
2.3.2 COI Model Exclusions

The COI model used for this study does not include the following costs:

- Cost of Research into diabetes
- Cost of Ambulance and private transport attributable to diabetes
- Cost of 'over the counter' medication for the management of diabetes
- Cost of reduced productivity of people with diabetes who are still engaged in the workforce, but are not able to operate at the same capacity as if they did not have diabetes (including treatment time)
- 'Out of pocket' expenses over and above MBS and PBS rebates
- Indirect cost of people exiting the labour force early due to diabetes.

The model only uses data related to the cost of diabetes among adults. The cost of diabetes among South Australians aged younger than 18 years remains to be investigated. In addition, while it is recognised that the presence of diabetes complications would be associated with increased costs, this model reports the average cost for people with diabetes and does not stratify by the presence or absence of complications.
2.4 Prevalence of Diabetes

The total population of South Australia at the end of June 2000 was 1,497,634.7 This figure is used for the population of SA for the year 2000. The population of South Australians aged over 18 and over was 1,124,494.

The North West Adelaide Health Study (NWAHS) found that the prevalence of diagnosed diabetes in the north west of Adelaide was 5.4% (95% CI 4.6-6.4, age 18+), and 1.2% for undiagnosed diabetes. People with diagnosed diabetes were defined as those who self-reported having been told by a doctor that they have diabetes. People with undiagnosed diabetes were defined as those who did not self report having been told by a doctor that they have diabetes, but had a fasting plasma glucose (FPG) level of at least 7.0 mmol/L. While the NWAHS is based on a specific region within the state, subsequent surveys performed on a state level have not challenged this diagnosed diabetes prevalence estimate. Self-reported prevalence of diabetes was found to be 6.2% (95% CI 5.3-7.2, age 18+) in the 2000 South Australian Health and Well Being Survey,11 and 6.0% (95% CI 5.1-6.9, age 15+) in the 2000 Health Omnibus Survey. The prevalence estimates found in these three studies are not statistically significantly different from each other. The NWAHS was chosen as the primary data source for this COI model due to the nature and volume of data available from this study, including information on the prevalence of undiagnosed diabetes.

Based on the NWAHS estimate, the population of people with diabetes in South Australia is summarised in Table 2.2.

Table 2.2: Prevalence and number of people 18+ in SA with diabetes, 2000

<table>
<thead>
<tr>
<th></th>
<th>Prevalence %</th>
<th>Estimated n</th>
</tr>
</thead>
<tbody>
<tr>
<td>People with diagnosed diabetes</td>
<td>5.4</td>
<td>60,700</td>
</tr>
<tr>
<td>People with undiagnosed diabetes</td>
<td>1.2</td>
<td>13,500</td>
</tr>
</tbody>
</table>

Data Source: NWAHS & ABS
CHAPTER 3: RESULTS
3.1 Direct Medical Cost Component Values

3.1.1 Hospital Costs

3.1.1.1 Inpatient Costs

An estimate for hospital inpatient costs due to diabetes was produced using Australian Refined Diagnosis Related Groups (AR-DRG). Three diabetes specific DRG’s were used, K60A (Diabetes with catastrophic or severe CC), K60B (Diabetes without catastrophic or severe CC) and K01Z (Diabetic Foot), with the average cost per DRG being multiplied by the number of separations in South Australia coded to that DRG. The ‘CC’ in the description of these DRG’s refers to complication and/or comorbidity. These three DRG’s are specific to diabetes, but do not necessarily include all the hospital resource use required by people with diabetes due to diabetes. For example, renal dialysis is coded to its own DRG, and so is not included in this cost estimate. For this reason, it is likely that the hospital inpatient cost estimate presented in this preliminary study underestimates the true level of resource use by people with diabetes due to diabetes.

The average cost per DRG was calculated through costing studies undertaken by the Department of Health, based on metropolitan hospitals. The metropolitan hospitals in the costing study were responsible for over 50% of all separations for the three DRG’s. The number of separations for each DRG are based on all hospitals activity as reported to ISAAC (Integrated South Australian Activity Collection). Data were presented for financial year periods, so the figures for 1999/2000 and 2000/2001 were averaged to estimate the figure for the calendar year 2000.

<table>
<thead>
<tr>
<th>DRG</th>
<th>Description</th>
<th>Total cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K60A</td>
<td>Diabetes W Catastrophic or Severe CC</td>
<td>1,888,914</td>
</tr>
<tr>
<td>K60B</td>
<td>Diabetes W/O Catastrophic or Severe CC</td>
<td>2,586,187</td>
</tr>
<tr>
<td>K01Z</td>
<td>Diabetic Foot</td>
<td>1,013,612</td>
</tr>
<tr>
<td></td>
<td><strong>Total Hospital Inpatient Cost</strong></td>
<td><strong>5,488,713</strong></td>
</tr>
</tbody>
</table>

Data Source: HC&EU, DHS
3.1.1.2 Outpatient Costs

All hospital outpatient activity is reported to the Department of Health through Monthly Management Summary System (MMSS) activity reports. Costing studies undertaken by the Department of Health also estimate the average cost of supplying outpatient services. As the costing studies use financial years as the reference period, the average costs for 1999/2000 and 2000/2001 were themselves averaged to estimate the calendar year 2000 cost. MMSS activity data were not available for 2000, however activity data were available for 2001/02. Due to the lack of alternative options, these activity data were used to estimate outpatient costs. The 2000 estimate may therefore be biased, with the magnitude and direction of the bias being unclear.

Table 3.2: Hospital Outpatient Cost 2000

<table>
<thead>
<tr>
<th></th>
<th>2000 Average Cost ($)</th>
<th>2001/02 Service Provision</th>
<th>Total Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Education</td>
<td>94</td>
<td>20,373</td>
<td>1,915,062</td>
</tr>
<tr>
<td>Diabetes</td>
<td>133</td>
<td>7,129</td>
<td>948,157</td>
</tr>
<tr>
<td><strong>Total Outpatient Cost</strong></td>
<td><strong>2,863,219</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data Source: HC&EU DHS

The combined total of outpatient and inpatient hospital costs was $8,351,932, which equated to $137.59 per person with diabetes.

3.1.2 MBS Rebate Costs

NWAHS linkage to HIC data provided information on MBS (Table 3.3) and PBS (Table 3.4) rebate costs.

Table 3.3: MBS Rebate Cost per person

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>$ Value (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs accrued to people with diagnosed diabetes</td>
<td>132</td>
<td>1123 (785 – 1460)</td>
</tr>
<tr>
<td>Costs accrued to people with undiagnosed diabetes</td>
<td>30</td>
<td>558 (189 – 927)</td>
</tr>
<tr>
<td>Costs accrued to people without diabetes</td>
<td>2190</td>
<td>425 (397 – 453)</td>
</tr>
</tbody>
</table>

Data Source: NWAHS with HIC MBS linkage
The costs of those with diagnosed diabetes were significantly different to the costs of those without diabetes. The costs of those with undiagnosed diabetes was also higher than for people without diabetes, but this did not reach statistical significance. It is likely that the lack of significance is due to the small sample size of people with undiagnosed diabetes. Based on the difference between the mean rebate paid per person with and without diabetes, the average MBS rebate cost per person with diabetes due to diabetes was $699. The MBS rebate cost for people with diabetes in South Australia was therefore $42,429,300.

### 3.1.3 Prescription Medication Costs

<table>
<thead>
<tr>
<th>Costs accrued to people</th>
<th>n</th>
<th>$ Value (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>with diagnosed diabetes</td>
<td>129</td>
<td>1034 (837 – 1231)</td>
</tr>
<tr>
<td>with undiagnosed diabetes</td>
<td>28</td>
<td>344 (131 – 557)</td>
</tr>
<tr>
<td>without diabetes</td>
<td>2152</td>
<td>191 (167 – 214)</td>
</tr>
</tbody>
</table>

Data Source: NWAHS with HIC PBS linkage

The costs of those with diagnosed diabetes were significantly different to the costs of those without diabetes. The costs of those with undiagnosed diabetes was also higher than for people without diabetes, but this did not reach statistical significance. It is likely that the lack of significance is due to the small sample size of people with undiagnosed diabetes. Based on the difference between the mean rebate paid per person with and without diabetes, the average PBS rebate cost per person with diabetes due to diabetes was $843. The PBS rebate cost for people with diabetes in South Australia was therefore $51,170,100.

### 3.1.4 Diabetes Nurse Educators

Participants in the NWAHS were asked questions about their health service utilisation. One of these questions, asked of all participants, was ‘In the last twelve months, how many times have you used a Nurse Educator?’
Table 3.5: Number of times Nurse Educators used in last 12 months per person

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean service use (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>With diabetes</td>
<td>137</td>
<td>0.20 (0.05 – 0.35)</td>
</tr>
<tr>
<td>Without diabetes</td>
<td>2350</td>
<td>0.01 (0.00 – 0.01)</td>
</tr>
</tbody>
</table>

Data Source: NWAHS

A cost per contact for Nurse Educators was calculated using information provided by the Diabetes Centre at the Queen Elizabeth Hospital and Health Service. This information included the number of Nurse Educator contacts made in 2000, and the cost of supplying these contacts for the year, based on annual salaries plus 40% oncosts. The cost per contact with a Nurse Educator was calculated as being $35 in year 2000 dollars. With people with diabetes making on average 0.2 contacts with Nurse Educators in a year, this leads to a total cost of $424,900 or $7 per person with diabetes.

3.1.5 Dieticians

Participants in the NWAHS were asked questions about their health service utilisation. One of these questions, asked of all participants, was ‘In the last twelve months, how many times have you used a Dietician?’.

Table 3.6: Number of times Dietician used in last 12 months per person

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean service use (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>With diabetes</td>
<td>137</td>
<td>0.26 (0.15-0.37)</td>
</tr>
<tr>
<td>Without diabetes</td>
<td>2350</td>
<td>0.04 (0.02-0.06)</td>
</tr>
</tbody>
</table>

Data Source: NWAHS

A cost per contact for Dieticians was calculated using information provided by the Diabetes Centre at the Queen Elizabeth Hospital and Health Service. This information included the number of Dietician contacts made in 2000, and the cost of supplying these contacts for the year, based on annual salaries plus 30% oncosts. The cost per contact with a Dietician was calculated as being $38.50 in year 2000 dollars. With people with diabetes making on average 0.22 more contacts with Dieticians in a year than people without diabetes, this leads to a total cost of $514,129 or $8.47 per person with diabetes.
3.1.6 Podiatrists

Participants in the NWAHS were asked questions about their health service utilisation. One of these questions, asked of all participants, was ‘In the last twelve months, how many times have you used a Podiatrist?’.

Table 3.7: Number of times Podiatrist used in last 12 months per person

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean Service Use (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>With diabetes</td>
<td>137</td>
<td>1.29 (0.84-1.73)</td>
</tr>
<tr>
<td>Without diabetes</td>
<td>2350</td>
<td>0.23 (0.18-0.27)</td>
</tr>
</tbody>
</table>

Data Source: NWAHS

While podiatrist services are not covered by the MBS, the Department of Veterans Affairs does provide a rebate for such services for eligible claimants. The rebate provided for initial consultation at rooms has been used to estimate the per unit Podiatrist cost. In 2003, this rebate was $40. To estimate the value of this rebate in 2000, the 2003 figure was deflated according to the change in the Consumer Price Index as calculated by the ABS, resulting in an estimate of $35 per consult. With people with diabetes making on average 1.06 more contacts with Podiatrists in a year than people without diabetes, this leads to a total cost of $2,251,970 or $37.10 per person with diabetes.
3.2 Direct Non Medical Cost Component Values

As no costing data for direct non medical costs of diabetes had been gathered in the past, questions relating to these issues were included in the May 2003 Health Monitor Survey.

3.2.1 Equipment/ Consumables Costs

The question “In the last four weeks, how much money have you spent on equipment for your diabetes, for example needles, syringes, glucometer etc?” was asked as part of the May 2003 Health Monitor Survey. This question was asked of those who had identified as having current diabetes. The mean self reported cost of equipment and consumables for diabetes in the last four weeks was $20 (95% CI 10-30) giving an estimate of $260 per person with diabetes for the year, or $230 per person (total cost $13,961,000) after converting to year 2000 dollars\(^9\).

3.2.2 Physical Activity

The question “In the last four weeks, how much extra money have you spent on exercise or physical activity that you need to do because you have diabetes?” was asked as part of the May 2003 Health Monitor Survey. This question was asked of those who had identified as having current diabetes. The mean self reported cost for physical activity in the last four weeks due to diabetes was $71 (95% CI 3-140) giving an estimate of $924 for the year, or $810 per person (total cost $49,167,000) in year 2000 dollars.

3.2.3 Diet

The question “In the last four weeks, how much extra money have you spent on special foods or dietary requirements that you need because you have diabetes?” was asked as part of the May 2003 Health Monitor Survey. This question was asked of those who had identified as having current diabetes. The mean self reported cost for special foods or dietary requirements in last four weeks due to diabetes was $72 (95% CI 50-94) giving an estimate of $934 for the year, or $820 per person (total cost $49,774,000) in year 2000 dollars.
3.3 Indirect Cost Component Values

Indirect costs are imputed values reflecting the impact to production caused by an illness. To value the productive time forfeited to diabetes, the average earnings for the period of the study are used. The average ordinary full time (seasonally adjusted) weekly earnings for South Australia in 2000 were taken from the ABS\textsuperscript{10} published figures. This was $745.50 per week (for the quarter ending August). This figure was used for valuing productive time when calculating indirect costs.

3.3.1 Cost of Carers

Data required to calculate the indirect cost of diabetes through carer time had not been gathered for the year 2000. To estimate this cost, data were gathered during the course of this study. The questions “Do you have someone who helps care for you because of your health. For example a family member, friend, paid carer, nurse, volunteer or domiciliary care worker?” and “In the last four weeks, how much time, in total, did this person/ these people spend helping you or caring for you?” were asked as part of the May 2003 Health Monitor Survey. Respondents were able to give the length of care time in either days or hours, with 67.5% of people who gave a time responding in days and 32.5% responding in hours. When attempting to combine the responses from the two answer types, it became apparent that answers given in days were too ambiguous from which to draw meaningful conclusions (i.e. it was unclear how many hours make up a ‘day’). As it is not appropriate to draw conclusions from time given in days, the impact of using only the answers given in hours was assessed.

There was no significant difference between the prevalence of diabetes amongst those who answered in days and those who answered in hours. The average age for the two answer groups was also not found to be significantly different. Analysing the responses given in hours produced a lower estimate, and had clearer meaning than analysing responses given in days. For these reasons, only responses given in hours were used to produce an estimate of the cost of carer time due to diabetes, although it is recognised that the results of the estimate for this cost component may not be as robust as for other components. The results of this analysis are shown in Table 3.8.
Table 3.8: Mean carer time in the last 4 weeks

<table>
<thead>
<tr>
<th>Have a carer</th>
<th>Mean carer time (hours) (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>With diabetes</td>
<td>9.4 39.11 (23.23-55.00)</td>
</tr>
<tr>
<td>Without diabetes</td>
<td>3.4 30.75 (1.83-59.67)</td>
</tr>
</tbody>
</table>

Data Source: Health Monitor May 2003

Although there is no difference in the number of days of carer help used by people with diabetes, the proportion of people with diabetes who use carers is larger than the proportion of people who do not have diabetes who use carers relative to their respective sub populations. This suggests that, while diabetes may not increase the time spent by a carer, it does increase the likelihood of a carer being required. Through this reasoning, 6% of people with diabetes will require the services of a carer due to their diabetes. This care will be required for a mean of 390 hours per year. The average weekly wage of $745.50 equates to $19.88 per hour. This results in a total cost of $28,237,000 per year, or $465 per person with diabetes. This figure assumes that the carer’s time could be used for an alternate productive purpose, and that it is appropriate to value the carer’s time with the average weekly wage.

3.3.2 Cost of Short Term Labour Loss

Data for 2000 to address this component were not available for this study. However, the 1998 SERCIS Health Goals and Targets Health Priority Areas Survey contained the question “How many days in the past four weeks were you unable to work or carry out your normal duties because of your health?”.

Table 3.9: Days off work or normal duties due to health, 1998

<table>
<thead>
<tr>
<th>Number of days off work or normal duties due to health</th>
<th>n</th>
<th>Value (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>With diabetes</td>
<td>515</td>
<td>5.48 (0.12 – 10.84)</td>
</tr>
<tr>
<td>Without diabetes</td>
<td>11462</td>
<td>2.97 (2.18 – 3.76)</td>
</tr>
</tbody>
</table>

Data Source: SERCIS Health Goals and Targets 1998

The difference in the number of days off work or normal duties experienced by people of working age with diabetes and people without diabetes was not found to be statistically significant. The health of people with diabetes has not been found to have seasonal variation different to the health of people without diabetes (personal communication with Dr P Phillips, Head of Endocrinology Unit, Queen Elizabeth Hospital and Health Service, Adelaide), so the four week period is considered representative of the year. Due to the lack of statistically significant difference in the
number of days off work or normal duties due to health between people with diabetes and people without, the value of short term labour loss due to diabetes was set to zero for this study.

The question ‘How many days in the past four weeks did you cut down or not get as much done as usual because of your health?’ was also asked in the 1998 SERCIS survey. Using the same process as above, it was found that there was a significant difference in the number of days that there was an impact to output due to health experienced by people with diabetes and people without diabetes. As the level of this impact is not quantified, it is not possible to estimate the overall impact diabetes has on reducing labour productivity. It is therefore recognised that there will be an underestimation of the cost of the impact to labour productivity attributable to diabetes in this study.

### 3.3.3 Cost of Labour Loss Due to Premature Mortality

Ascribing the cost of mortality due to an illness or condition is not an exercise in valuing a life, or the lives that have been lost. To suggest the cost of a death from a particular condition is ‘x’ dollars is not to suggest that the value of that life was ‘x’. It is a valuation of the economic impact felt by the reference group (in the case of this COI study, society as a whole in South Australia) through the loss of an economic resource. Typically, in COI studies, the cost of mortality is estimated through the Human Capital Method. This method estimates the number of productive years lost through mortality due to the illness or condition (i.e. the difference in the age at death, and the age at which an individual would otherwise be expected to cease productive employment). The Human Capital Method may overestimate the actual production lost by a considerable extent. Koopmanschap et al suggest that measuring and valuing the friction period, essentially the time required to fill a vacancy, will give a more appropriate estimate for the actual loss incurred. In producing their estimate, they also consider the macroeconomic effects, such as changes in the labour market, that disease has. In the year 2000, there were fifty working age deaths attributed to diabetes in South Australia. We do not expect that this would have a significant effect on the state’s labour market, and so do not consider the macroeconomic effects of diabetes in this study. In estimating the indirect cost of mortality due to diabetes, we consider the number of working age deaths due to diabetes for the year 2000, and the friction period, that is, between start of absence from work and replacement.

No single data source was identified to estimate the average duration of unexpected vacancies. Through various conversations and consultations with people involved in
private sector recruitment, a friction period of eight weeks was adopted for the purposes of estimating the indirect costs of mortality due to diabetes.

The participants in the NWAHS who had diagnosed diabetes and who were of working age were split into five year age groups, ranging from 18 to 65, which was considered retirement age for both males and females. The relative percent of participants that identified themselves as in formal employment (full time, part time or casually employed) was ascertained. The number of deaths with diabetes as underlying cause was multiplied by this relative percent to estimate the number of deaths due to diabetes in 2000 that involved people of working age in recognised employment, resulting in an estimate of 16 persons. As mentioned previously, the production loss represented by these deaths would have lasted 8 weeks, at an average weekly wage of $745.50. This then produces an estimate of the impact to production due to diabetes mortality of $95,424 for the year 2000.
3.4 Total Cost

The values of the individual cost components of this diabetes COI model are summarised in Table 3.10.

<table>
<thead>
<tr>
<th>Cost Component</th>
<th>SA Total</th>
<th>Per Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Costs (Medical)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital related costs</td>
<td>8,351,900</td>
<td>138</td>
</tr>
<tr>
<td>MBS rebates claimed</td>
<td>42,429,300</td>
<td>699</td>
</tr>
<tr>
<td>PBS rebates claimed</td>
<td>51,170,100</td>
<td>843</td>
</tr>
<tr>
<td>Diabetes Nurse Educator</td>
<td>424,900</td>
<td>7</td>
</tr>
<tr>
<td>Dieticians</td>
<td>514,100</td>
<td>8</td>
</tr>
<tr>
<td>Podiatrists</td>
<td>2,252,000</td>
<td>37</td>
</tr>
<tr>
<td>Direct Costs (Non Medical)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of Equipment/Consumables</td>
<td>13,961,000</td>
<td>230</td>
</tr>
<tr>
<td>Cost of additional physical activity</td>
<td>49,167,000</td>
<td>810</td>
</tr>
<tr>
<td>Additional costs of special diet</td>
<td>49,774,000</td>
<td>820</td>
</tr>
<tr>
<td>Indirect Costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of carer</td>
<td>28,237,000</td>
<td>465</td>
</tr>
<tr>
<td>Short Term Labour Loss</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Permanent Labour Loss</td>
<td>95,400</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>246,376,700</td>
<td>4059</td>
</tr>
</tbody>
</table>

The average cost per person with diabetes in 2000 was $4059. Medical costs made up 48.2% of the direct costs, at an average of $1732 per person. Non medical costs made up 51.8% of the direct costs with additional costs of physical activity and special diets making up 87.6% of these non medical direct costs. The total direct cost of diabetes in 2000 was $218 million. This figure increased to over $246 million when indirect costs were also included.
References


