The cost of diabetes in Latin America and the Caribbean

Alberto Barceló, Cristian Aedo, Swapnil Rajpathak, & Sylvia Robles

Objective To measure the economic burden associated with diabetes mellitus in Latin America and the Caribbean.

Methods Prevalence estimates of diabetes for the year 2000 were used to calculate direct and indirect costs of diabetes mellitus. Direct costs included costs due to drugs, hospitalizations, consultations and management of complications. The human capital approach was used to calculate indirect costs and included calculations of forgone earnings due to premature mortality and disability attributed to diabetes mellitus. Mortality and disability attributed to causes other than diabetes were subtracted from estimates to consider only the excess burden due to diabetes. A 3% discount rate was used to convert future earnings to current value.

Findings The annual number of deaths in 2000 caused by diabetes mellitus was estimated at 339,035. This represented a loss of 757,096 discounted years of productive life among persons younger than 65 years (>US$ 3 billion). Permanent disability caused a loss of 12,699,087 years and over US$ 50 billion, and temporary disability caused a loss of 136,701 years in the working population and over US$ 763 million. Costs associated with insulin and oral medications were US$ 4,720 million, hospitalizations US$ 1,012 million, consultations US$ 2,508 million and care for complications US$ 2,480 million. The total annual cost associated with diabetes was estimated as US$ 65,216 million (direct US$ 10,721; indirect US$ 54,496).

Conclusion Despite limitations of the data, diabetes imposes a high economic burden to individuals and society in all countries and to Latin America and the Caribbean as whole.

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The care of diabetes and other noncommunicable diseases presents a challenge for most health care systems in Latin America and the Caribbean. Some countries in the region are facing an increasing prevalence of diabetes and other noncommunicable diseases, while still experiencing a high incidence of communicable diseases. Diabetes is a chronic disease that requires lifelong, continuous medical care. Health care services in developing countries are oriented to acute medical care.

This cost-of-illness study aimed to estimate the economic burden of diabetes in Latin America and the Caribbean in 2000. This report presents a societal perspective of the cost of diabetes. Calculations included indirect costs due to premature mortality, absenteeism and disability, as well as direct costs attributed to drugs, consultations and hospitalizations.

Methods For all the calculations in this study, we used Amos et al.’s prevalence estimates for 2000 (2). We used the distribution by age from a recent diabetes survey in Bolivia to break down the total population with diabetes into age groups (3). A distribution of countries based on per capita gross national product (GNP) values was used to classify the countries into four groups (Table 1) (4).

Costs for different items related to medical care for people with diabetes were obtained for one or two countries in each group from various sources, such as the government, Pan American Health Organization (PAHO) and diabetes associations. When more than one estimate was available for one item in the same country, we calculated an average of the cost (Table 2). We assumed that costs for different items were similar within each country group. A 3% discount rate was used to convert future earnings to current value.

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Voir page 25 le résumé en français. En la página 26 figura un resumen en español.

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The prevalences of major complications were estimated from a survey that included 8100 people with diabetes who attended clinics and hospitals in Chile (8). The survey was an audit of clinical records that reproduced previous evaluations of care conducted in various institutions in Latin American and Europe (9, 10). We identified amputation, retinopathy, cardiovascular disease, nephropathy, neuropathy and peripheral vascular disease as complications. For each of these, we obtained the cumulative probability as a function of the duration of diabetes in years (1–55 years or more) and estimated the distribution of diabetes duration — a weighted probability — for each complication (Table 3). Prevalence of complications was estimated by applying the mean probability of each complication in this data to Amos et al.’s estimated population with diabetes (2).

White et al. estimated the average cost of treating retinopathy, heart disease, nephropathy and neuropathy in Chile (11). We obtained the cost of standard diabetes care (three physician visits, one visit to an ophthalmologist, one HbA1c test, one lipid profile, one electrocardiogram, one proteinuria test and the average cost of one year’s supply of insulin and oral hypoglycaemic drugs) in Chile and calculated a ratio with the increase of cost for each complication. The ratio was then applied to the cost of care in each group of countries in order to estimate the cost of treatment of each complication. The cost of each complication was then multiplied by its estimated prevalence.

### Indirect cost

We used the human capital approach to calculate the indirect cost of diabetes in Latin America and the Caribbean in 2000.

### Mortality cost

Estimates of the indirect cost of diabetes included the calculation of lifetime, forgone earnings due to premature mortality and disability attributed to diabetes. To estimate the number of deaths, we applied the known increased risk of dying for people with diabetes (3.5 times for those with type 2 diabetes and 7.5 times for those with type 1 diabetes (12, 13)) to the general mortality rate (14) and then multiplied the result by the estimated number of people with diabetes. The number of deaths corresponding to the general mortality rate was then subtracted, so that we included only those deaths attributed to diabetes. Deaths in each age group were estimated using official data on mortality from diabetes as an underlying cause of death in the region (14, 15). Discounted future lifetime
earnings were calculated for the estimated deaths in those aged <65 years using the most recent figure for per GNP as a proxy for estimated potential annual earnings (4).

Disability cost
Permanent disability. We used results of surveys conducted in Chile (8) and Costa Rica (6) to estimate the prevalence of permanent disability due to diabetes. We estimated that 8% of the total population with diabetes was permanently disabled (different estimates by age group were derived from the Chilean study) (8). The disability rate reported in the population without diabetes in the Costa Rica survey was then subtracted, so that we included only the proportion of disability attributed directly to diabetes (5). We used this estimate and the prevalence rates by age to calculate the number of discounted years of productive life lost (YPLL). The cost of permanent disability was then estimated by multiplying the per capita GNP by the number of YPLL.

Temporary disability. We used the proportion of people with diabetes without complications from a study in Chile (8). The numbers of disability days related and unrelated to diabetes were obtained from a research report from Argentina (16). We assumed that 40% of the population with diabetes aged <65 years (after excluding those assumed to have permanent disability mentioned before) were economically active. Forgone earnings for 2000 were calculated by applying the corresponding per capita GNP.

Appendix 1 (web version only, available at: http://www.who.int/bulletin/) provides an overview of each cost component as well as the methodology used in their calculations.

Results
The numbers of people with type 1 and type 2 diabetes were estimated at 377,500 and 14,863,700, respectively (Table 4). Overall, in the region, type 2 diabetes accounted for 97.5% of cases of diabetes mellitus, with a prevalence of 3.2%; this compared with a prevalence of 0.1% for type 1 diabetes. The total number of deaths among people with diabetes was estimated at 339,035. A total of 96,867 deaths were estimated to be related to the risk of dying from general causes, while 242,168 deaths were related to the increased risk attributed to diabetes. Diabetes caused an estimated 83,090 deaths among those with diabetes aged <65 years in 2000. The corresponding number of YPLL was 757,096; this represented a cost of US$ 3,099,000.

The total number of people with diabetes and permanent disability was estimated at 726,575. This represented 12,699,087 YPLL or a loss of US$ 50.6 billion. The number of people with diabetes who were temporarily disabled was estimated at >6 million. With our assumption that 40% of patients with diabetes (>2.4 million) were economically active, diabetes caused the loss of 136,700 discounted years of productivity, costing over US$ 763 million from loss of days at work. The total indirect cost was estimated at almost US$ 54.5 billion; mortality, permanent disability and temporary disability accounted for 6%, 92% and 2% of this amount, respectively.

Table 5 shows the estimated direct costs of diabetes. The number of people taking insulin was estimated at more than 1 million. This included all people with type 1 diabetes and an assumed 5% of people with type 2 diabetes. With our assumption that 80% of people had type 2 diabetes, we calculated that almost 12 million people with diabetes used oral drugs to control their blood glucose levels. The attributed cost was estimated at US$ 1.9 billion for insulin and US$ 2.8 billion for oral drugs. The overall estimated cost of drugs for people with diabetes was over US$ 4.7 billion.

Overall, the number of hospitalizations was estimated at 1,954,066; 988,528 of these were assumed to be the result of

<table>
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<tr>
<th>Item</th>
<th>Mexico</th>
<th>Spanish Carolina</th>
<th>English Carolina</th>
<th>Central America</th>
<th>South America</th>
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<tr>
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<td>5,150</td>
<td>32,115</td>
<td>316,070</td>
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<td>12.6</td>
<td>19.2</td>
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<td>No. of people with type 2 diabetes mellitus</td>
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<td>906.8</td>
<td>311.7</td>
<td>1185.8</td>
<td>8734.0</td>
<td>14,863.7</td>
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<tr>
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<td>3738.0</td>
<td>926.0</td>
<td>317.2</td>
<td>1192.6</td>
<td>9067.4</td>
<td>15,241.2</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of deaths</td>
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<td>21,965</td>
<td>7776</td>
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<td>47,846</td>
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<td>2221</td>
<td>7508</td>
<td>61,723</td>
<td>96,867</td>
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<td>Deaths related to diabetes</td>
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<td>15,689</td>
<td>5555</td>
<td>18,770</td>
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<td>No. of deaths in those &lt;65 years?</td>
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<td>5383</td>
<td>1906</td>
<td>6440</td>
<td>52,944</td>
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<td>58,680</td>
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<td>50.9</td>
<td>93.6</td>
<td>2,302.2</td>
<td>3,099.0</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>No. of permanently disabled patients</td>
<td>178,187</td>
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<td>15,064</td>
<td>56,870</td>
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<td>No. of temporarily disabled patients</td>
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<td>Years of productive life lost</td>
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<td>8,305</td>
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<td>10,697</td>
<td>5,478</td>
<td>136,701</td>
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<tr>
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<td>186.3</td>
<td>14.8</td>
<td>11.3</td>
<td>25.1</td>
<td>26.8</td>
<td>763.1</td>
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<tr>
<td>Total indirect cost (US$ ×10^6)</td>
<td>13,144.1</td>
<td>1054.8</td>
<td>812.4</td>
<td>1788.1</td>
<td>37,696.5</td>
<td>54,495.9</td>
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* Economically active.
general causes and 965,538 directly related to diabetes. Diabetes caused a total of 3,191,574 days in hospital, representing a lost of about US$ 332 million.

Diabetes was responsible for more than 35 million medical visits, priced at more than US$ 888 million. As many as 1.8 million people were affected with heart disease, and a similar number was affected by retinopathy. Nephropathy affected 0.8 million people with diabetes, neuropathy, 1.1 million and peripheral vascular disease, 0.8 million. Overall, complications of diabetes were responsible for costs of more than US$ 2.4 billion. Among the diabetic complications we studied, the highest cost was attributed to nephropathy (US$ 1.8 billion); this was followed by retinopathy (US$ 267 million) and cardiovascular diseases (more than US$ 240 million). Medications, hospitalizations, consultations and complications had contributed 43%, 10%, 24% and 23% of these costs, respectively.

Table 6 shows the total cost of diabetes by country, as well as the contributions of direct and indirect costs. The overall contribution of indirect costs was 82% and of direct costs was 18%. The proportion of indirect and direct costs varied somewhat among countries — the lowest proportion of direct costs was found in Argentina (7%) and the highest in Nicaragua (66%). Per capita costs of diabetes care were highest in Cuba (US$ 1219) and lowest in Colombia (US$ 442). The average per capita expenditure on health (latest available figures) in the region was US$ 220, while the average cost of care per person with diabetes was US$ 703; it was lowest in Haiti (US$ 24) and highest in Argentina (US$ 882). In general, the costs of caring for diabetes were more than 300% higher than the average health expenditures in Latin America and the Caribbean — ranging from 68% in Argentina to 2517% in Haiti.
Discussion

A severe lack of data about the economic burden of diabetes mellitus in most countries of Latin America and the Caribbean motivated our complex economic analysis. In view of the increasing global prevalence of diabetes, information from cost-of-illness studies should be used to increase awareness and lobbying for allocation of resources.

Cost estimates provide information that describes used resources (direct costs) and productivity losses (indirect costs) (17). Cost estimates must be reviewed with caution, however, because inaccuracies may occur when costs are estimated in a great number of countries with different economic, health and accounting systems. Estimates in this paper are conservative, and in some cases they intentionally underestimate the true cost of different items.

Comments have been made on the risk of including the undiagnosed portion of diabetes in studies of the costs of diabetes. In this respect, we compared the studied prevalence of diabetes in some countries with Amos et al’s estimates (2). Results of the Bolivian survey showed a prevalence of 7.2% in four urban conglomerates, of which 5% had already been diagnosed with diabetes (3). Amos et al’s prevalence of diabetes for Bolivia was only 2% (2). We think, therefore, that the estimates we used in our calculation are conservative and do not contribute to an overestimation of the cost of diabetes.

It has been said that overestimates of indirect costs may occur when using the human capital approach (18–21), and the frictional cost approach is believed to be more conservative (22–24). The paucity of information needed to apply the frictional cost approach meant that it was not a feasible option for this study.

The number of deaths among people with diabetes was estimated at 339,035 in 2000, although the number of reported deaths with diabetes as the underlying cause of death in Latin America and the Caribbean is approximately 40,000 per year. This means that vital statistics based on the underlying cause of death may have an undercount of up to 60% of diabetes-related deaths. The limitations of death certificates for...
measuring diabetes-related deaths are well known (25, 26, 28–30). The undercount of diabetes-related deaths in vital statistics is also supported by medical literature from Brazil (31), Cuba (32, 33), Costa Rica (34) and Jamaica (35). Murray & Lopez estimated diabetes mortality for Latin America and the Caribbean as 263 700 in 1995 (36). Our estimate of mortality was comparable, although differences in methods can be noted. A recent report estimated the number of deaths related to diabetes in Latin America and the Caribbean to be higher than that reported here (465 828 deaths vs 339 035 in the present study) (37). We believe that the WHO estimates are more precise because they are based on more complex methods to account for the risk of dying at different ages.

A previous analysis estimated the annual direct cost of diabetes in Latin America and the Caribbean at US$ 3 billion, or US$ 353 per person (38). That figure was obtained by assuming that 6% of the health budget of the region was allocated to diabetes. Our estimate showed a higher direct cost of US$ 10.7 billion, or US$ 701 per person. We used reported statistics to estimate that number, so countries reporting better access to care — such as higher numbers of medical visits (or hospitalizations) per individual — were estimated to have a higher number of medical visits (or hospitalizations) for people with diabetes. Henry-Lee et al. (39) estimated the health care cost in Jamaica by interviewing people suffering from various diseases in 2000. Their estimate of the annual cost of diabetes care was US$ 437, while the average cost of the same care in Jamaica in our study was US$ 491. This seems to further support the validity of our method in accessing direct costs.

An earlier study in Mexico on the cost of diabetes reported a total cost of US$ 430 million (US$ 100 million of direct costs and US$ 330 million of indirect costs) (18). Our calculation for Mexico reported a total cost of US$ 15.1 billion (US$ 1.9 billion of direct costs and 13.1 billion of indirect costs). Differences in the estimated costs of diabetes in Mexico between our study and the previous analysis are because of differences in the estimates of the prevalence of diabetes used.

Although the previous study assumed that 960 000 people (only 1.2% of the population) had diabetes, our study estimated that 3 738 000 people (4.1% of the population) had diabetes (2). This discrepancy resulted in a significantly higher estimate of the numbers of deaths and disabilities attributed to diabetes, as well as of the direct costs in our study. Higher estimates of the number of people with diabetes in Mexico (such as Amos et al.’s estimate (2), which we used in our study) are supported by two studies that reported a prevalence of diabetes in Mexico City of 13% and 8.7% in 1992 and 1994, respectively (40, 41). A national survey in 1993 showed the prevalence of diabetes was 7.2% and of diagnosed diabetes was 5.1% (42). Villareal-Rios et al., using a different method, estimated that the total direct cost of diabetes mellitus was US$ 2.6 billion — this is close to our estimate of US$ 1.9 billion (43).

A study in Chile (11) in 1995 produced lower estimates than ours. The total cost of diabetes was estimated at US$ 1 billion, while our estimate for Chile was more than two times higher (US$ 2.4 billion). The difference in indirect costs (and total costs) was related to the inclusion in our study of the cost of diabetes-related mortality, which was not the case in the Chilean study. Similarities in the methods for calculating direct costs mean that both studies were comparable in this regard. The direct cost in the Chilean study was calculated at US$ 300 million, or US$ 570 per person with diabetes (11) while our estimates of direct costs for Chile were US$ 294 million, or US$ 594 per person with diabetes.

In the USA, the most recent published analysis by the American Diabetes Association (ADA) estimated the cost of diabetes at US$ 98 billion (44). Moreover, the ADA attributed a total of US$ 44.1 billion costs to direct medical care (US$ 10 071 per capita); this is extremely high when compared with our estimated US$ 10.7 billion costs for Latin America and the Caribbean (only US$ 703 per capita). Our calculations of indirect costs were based on estimates of mortality costs of US$ 37 000 per life lost; this is also lower than the US estimate of US$ 106 187 per life lost. This difference accounted for the lower number of forgone earnings for people living in Latin America and the Caribbean. In addition, we only calculated forgone earnings for economically active individuals, and we assumed that 40% of people with diabetes were economically active. Other studies have included loss of unpaid labour, such as the value of homemaking services, housekeeping, caregiver costs and leisure time. We did not include these factors, and therefore our calculation of indirect costs when compared to the ADA study (44) probably, therefore, underestimated the value of lost work because of premature death or disability.

Costs may be underestimated if co-morbidity of the various complications of diabetes is not considered (45). We tried to estimate co-morbidity among the various complications of diabetes, but we did not include this because of unsolved limitations, such as the absence of measurements in the Chilean study which we used as a platform for our study. The prevalence of the major complications used here may not correspond with the actual prevalence of complications in the population with diabetes, with the estimates for the prevalence of some complications, such as retinopathy and nephropathy, being intentionally lower than those reported by a population-based survey in Brazil (46). On the other hand, it seems adequate to calculate medical costs using the prevalence of complications among patients attending clinics.

Studies in the USA (44) and Canada (47) showed that direct costs are higher than indirect costs. In our study, however, indirect costs accounted for 82% of the total costs. We believe this is because of the lack of coverage of continuous care for a significant proportion of the population with diabetes in Latin America and the Caribbean, which may have led us to underestimate the cost of medical care. An increase in access to care would also increase the direct costs related to diabetes, and, if care is effective, this may reduce the mortality and rates of disability related to diabetes. In general, the costs of care of diabetes in the USA (US$ 10 071 per person, or US$ 7400 per person if care for conditions other than diabetes is subtracted) were 10–15 times more expensive than in Latin America and the Caribbean (an average of US$ 703 per person) (44). Although this difference may be real, we did not include a number of items, such as home health care, emergency visits, medical equipment and ambulance services, in our study. This difference contributed to the disparity in relation to direct cost between our results and those of the American cost study.

In our study, the balance between direct and indirect costs was driven mostly by the per capita GNP, which we used to calculate indirect costs. In general, countries in group 1 (Argentina, Barbados, Bahamas, and Trinidad and Tobago) had a very low proportion of direct costs compared...
with countries in group 4 (Bolivia, El Salvador, Honduras, Nicaragua, and Haiti), which had a high proportion of direct costs. The cost of per capita diabetes care was comparable among the groups (US$ 577, US$ 607, US$ 491 and US$ 550 for groups 1–4, respectively). This resulted in a more homogeneous output for the direct cost per capita among studied countries. However, exceptions were found, with extremely high and low estimated direct costs noted in Cuba (US$ 1219) and Colombia (US$ 442), respectively.

These exceptions were caused by unusually high estimates of consultations (6.3 per 100 population) and hospitalizations (13.5 per 100 population) in the general population of Cuba and by low estimates in Colombia (0.7 consultations per 100 population and 6.1 hospitalizations per 100 population) (7).

Although direct per capita costs in most countries (except Cuba and Colombia) were comparable, a large gap was seen in the excess of costs of diabetes care when compared with governments’ per capita expenditures on health. This suggests that, in most countries, health expenditures were much lower than the cost of health care for people with diabetes. The disparity between the cost of care and health expenditures varied somewhat in the region, and it was highest among countries from groups 3 and 4. Only Argentina had per capita direct costs lower than per capita health expenditures.

Another important aspect not included in our analysis was the calculation of out-of-pocket expenses. A recent cost study from Jamaica reported that 57% of interviewed people with diabetes experienced financial difficulties because of illness and that 50% of those admitting economic difficulties reportedly avoided some medical treatment because of economic constraints (39).

Conclusion

Our data show that research into the health economics of diabetes is still insufficient and should be prioritized. Despite the limitations of our data, the results show that diabetes imposes a very high economic burden on the individuals and society of each country and on the region of Latin America and the Caribbean as a whole. Although we may have underestimated the direct costs of diabetes, our results show a gap between health expenditures in the region and the cost of diabetes care. This gap may promote adverse outcomes, such as a high frequency of complications, disabilities and premature mortality notably discouraging patients from seeking health care.

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Conflicts of interest: none declared.

Résumé

Cost of diabetes in Latin America and the Caribbean

Objectif Mesurer la charge économique associée au diabète sucré en Amérique latine et dans les Caraïbes.

Méthodes Des estimations de la prévalence du diabète pour l’année 2000 ont été utilisées pour calculer les coûts directs et indirects du diabète sucré. Les coûts directs comprenaient le coût des médicaments, des hospitalisations, des consultations et de la prise en charge des complications. L’approche basée sur le capital humain a été utilisée pour calculer les coûts indirects et tenait compte de la perte de revenus due à la mortalité et à l’incapacité prématurées attribuées au diabète sucré. La mortalité et l’incapacité attribuées à d’autres causes ont été déduites des estimations afin d’examiner uniquement le surcroît de charge économique imputable au diabète. Un taux de réduction de 3 % a été appliqué pour rapporter les revenus futurs à leur valeur actuelle.


Conclusion Malgré les données limitées, on peut estimer que le diabète impose une lourde charge économique aux individus et à la société dans tous les pays comme dans l’ensemble de l’Amérique latine et des Caraïbes.
Resumen

El costo de la diabetes en América Latina y el Caribe

Objetivo Medir la carga económica asociada a la diabetes mellitus en América Latina y el Caribe.

Métodos A partir de las prevalencias estimadas de la diabetes para el año 2000 se calcularon los costos directos e indirectos de la enfermedad. Los costos directos incluyeron los gastos en medicamentos, las hospitalizaciones, las consultas y el tratamiento de las complicaciones. Para estimar los costos indirectos se utilizó un criterio basado en el capital humano, que incluía el cálculo de los ingresos no percibidos como consecuencia de la mortalidad prematura y la discapacidad atribuidas a la diabetes mellitus. La mortalidad y la discapacidad atribuidas a otras causas distintas de la diabetes se restaron de las cifras estimadas para considerar así únicamente el exceso de carga debido a la diabetes. Se aplicó una tasa de descuento del 3% para convertir al valor actual los ingresos futuros.


Conclusión Pese a las limitaciones de los datos, cabe concluir que la diabetes impone una alta carga económica a los individuos y la sociedad en todos los países y en el conjunto de América Latina y el Caribe.

Referencias

The cost of diabetes in Latin America and the Caribbean


### Appendix 1. Summary of costs

<table>
<thead>
<tr>
<th>Costs</th>
<th>Source</th>
<th>Cost (US$ x 10^6)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indirect</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent disability</td>
<td>Number of persons with diabetes with permanent disability: 726 575. Estimated by applying the proportion of people permanently disabled due to diabetes, which was assumed to be approximately 8% of the total population with diabetes.</td>
<td>50 633.9</td>
</tr>
<tr>
<td></td>
<td>Number of years lost due to permanent disability: before age 65 years with a 3% discount rate is 126 999 087. Cost calculated by multiplying years lost to disability by annual per capita GNP.</td>
<td></td>
</tr>
<tr>
<td>Temporary disability</td>
<td>Estimated number of people with diabetes who are economically active (assumption: 40% of all people with diabetes) is 2 438 600.</td>
<td></td>
</tr>
<tr>
<td>Mortality</td>
<td>Number of sick days per year among people with diabetes and major complications and who are economically active (60%): 94 441 253. Applying result of research from Argentina (8). Estimated number of deaths: 339 035. Estimated number of deaths due to diabetes and its complications among those younger than 65 years of age: 83 090. Estimated number of years lost due to premature mortality: 757 096. Years lost before age 65 years with a 5% discount rate. Cost calculated by multiplying years lost to disability in each country by annual per capita GNP.</td>
<td>763.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Direct</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulin</td>
<td>Assumption: proportion of people with diabetes using insulin = all people with type 1 and 4% of those with type 2 diabetes.</td>
<td></td>
</tr>
<tr>
<td>Oral medication</td>
<td>Insulin consumption per year: 10 000 units per person (5). Number of insulin users: 1 120 685. Assumption: Oral medication consumption per year: 1500 per person per year. Oral drug users: 80% of the total population with diabetes. Oral medication users: 11 890 960.</td>
<td>1940.3</td>
</tr>
<tr>
<td>Consultations</td>
<td>Estimated number of consultations per year for people with diabetes: 100 334 046. Number of consultations per inhabitant from health condition in the Americas multiplied by the estimated number of persons with diabetes. Assumption: people with diabetes have 1.55 more medical visits (6). Related to diabetes: 35 552 250. Number of extra consultations related to diabetes 1.55% from a survey in Costa Rica (6).</td>
<td>2508.4</td>
</tr>
<tr>
<td>Hospitalizations</td>
<td>Total number of hospitalizations per year for people with diabetes: 1 954 066. Number of hospital discharges per inhabitant from health conditions in the Americas (7) multiplied by the estimated number of people with diabetes. Assumption: people with diabetes have 1.98 more hospitalizations (6). Related to diabetes: 965 538. Number of extra hospitalizations related to diabetes from a survey in Costa Rica (6).</td>
<td>1012.0</td>
</tr>
<tr>
<td>Complications</td>
<td>Cost of treatment of complications. A ratio of the cost of diabetes care and the cost of complications (retinopathy, cardiovascular diseases, nephropathy, neuropathy and peripheral vascular disease) from research in Chile (11) was applied to the prevalence of complication taken from the Chilean database (8).</td>
<td>2480.4</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td>54 495.9</td>
</tr>
<tr>
<td><strong>Combined indirect and direct costs (US$ x 10^6)</strong></td>
<td></td>
<td>65 216</td>
</tr>
</tbody>
</table>