



**Pan American
Health
Organization**



**World Health
Organization**

**Regional Office for the
Americas**

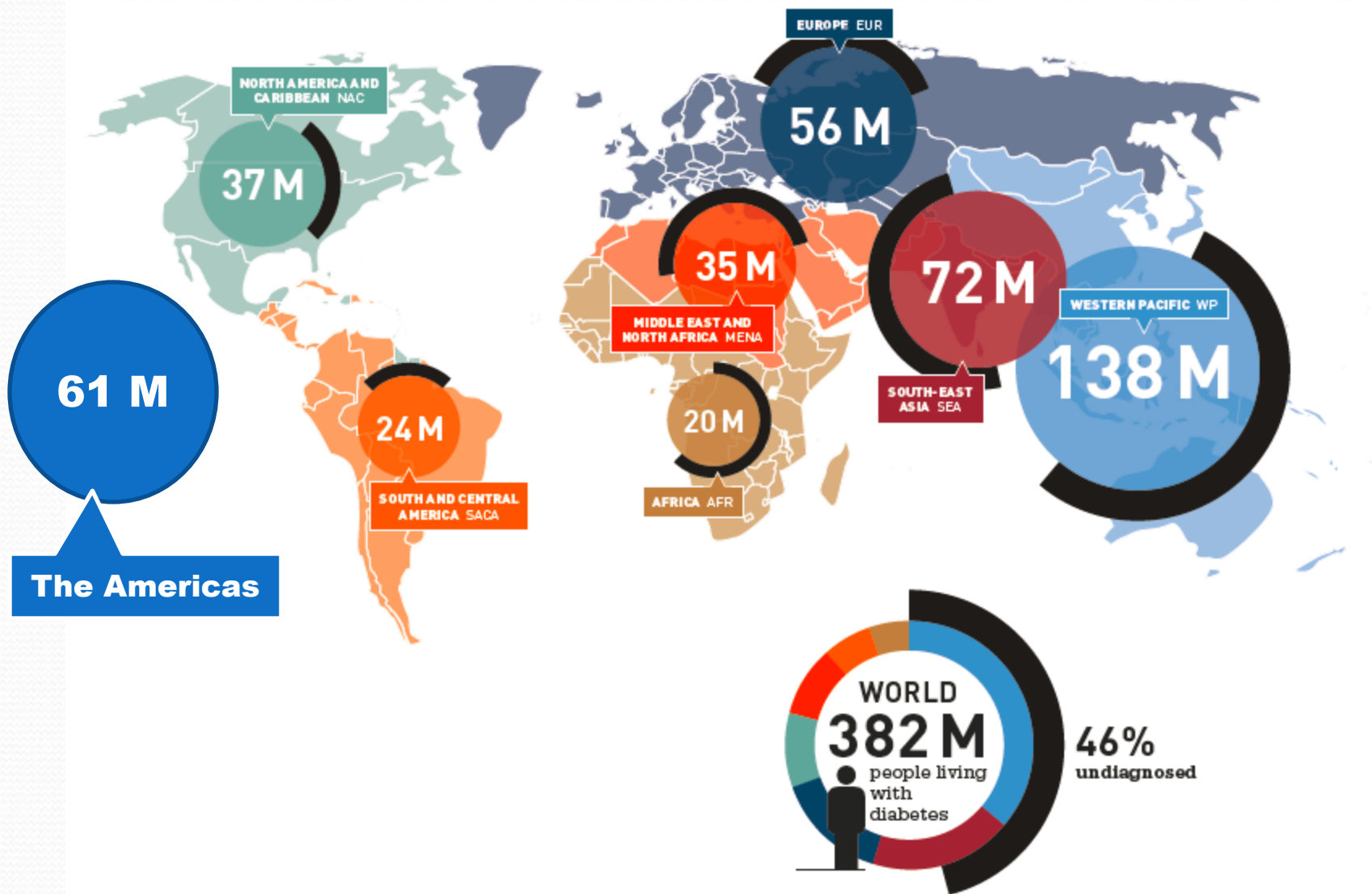
The Cost of Diabetes in Latin America & the Caribbean in 2014

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Presenter:

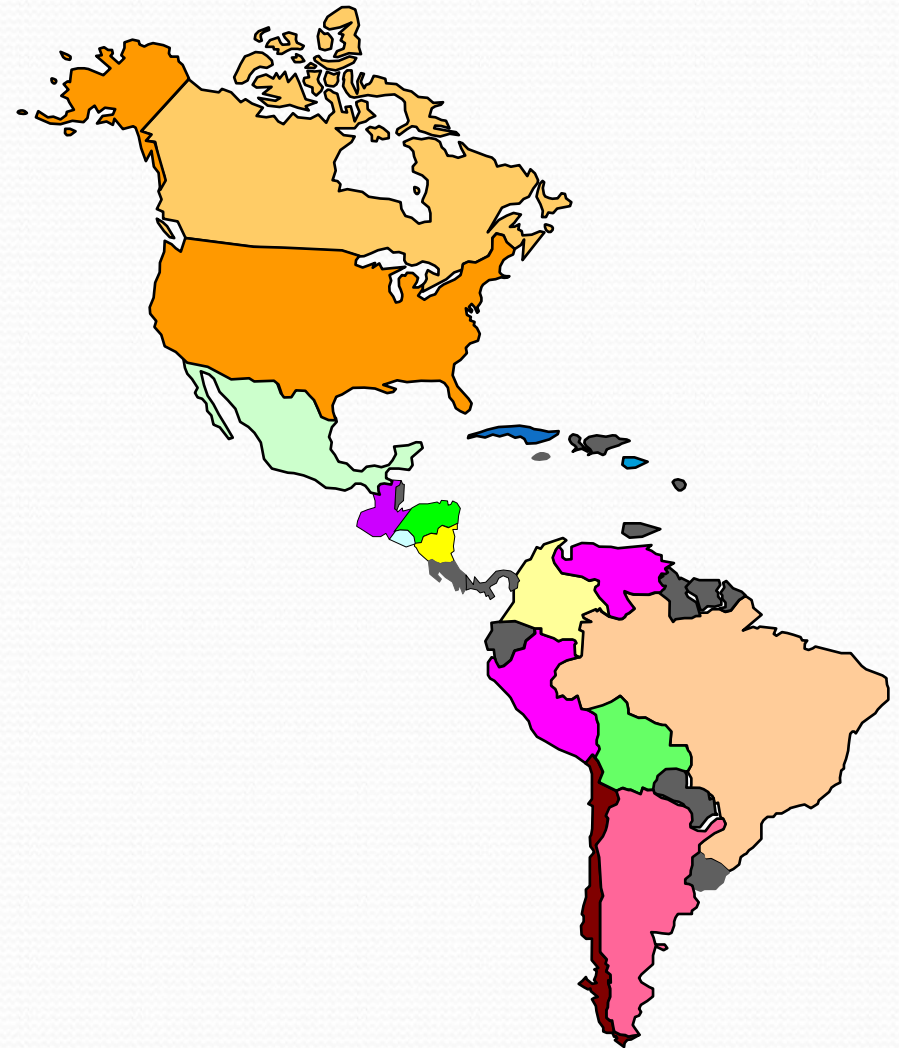
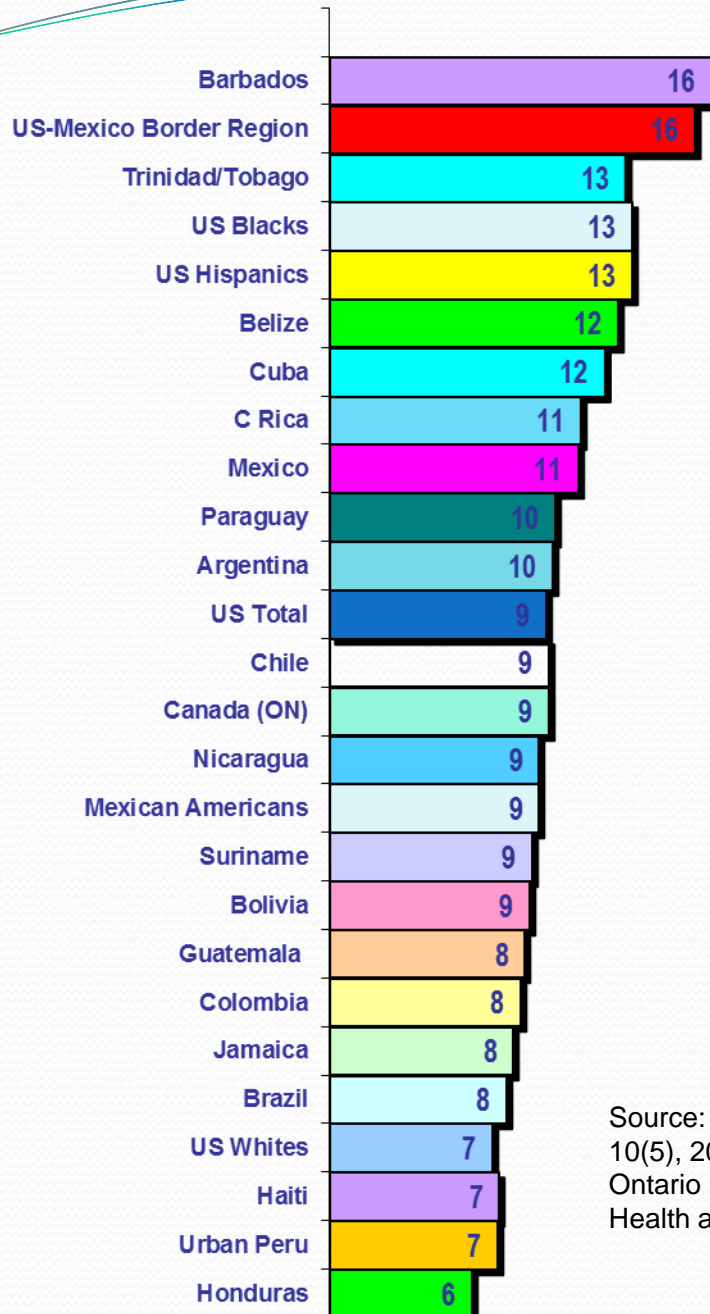
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Diabetes in the World



Source: Diabetes Atlas, Sixth Edition 2013

Prevalence (%) of diabetes among adults in the Americas



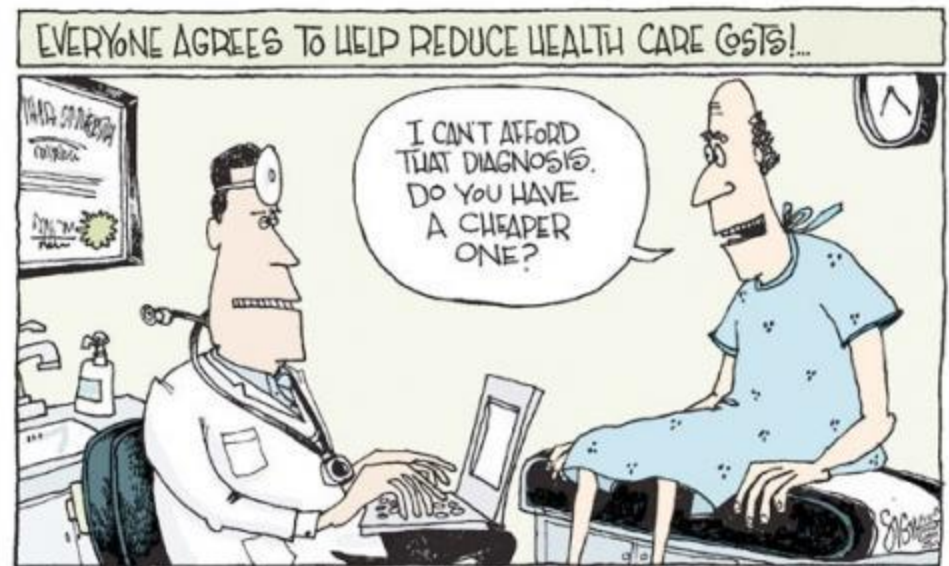
Source: US: National Diabetes Statistics Report, 2014; *Pan Am J Public Health* 10(5), 2001; Barceló Diabetes Care 2012I, Haiti (Diabetic Medicine); Canada, Ontario Lipscombe & Hux 2007; US Mexico Border Project. Jamaica (Jamaica Health and Lifestyle Survey, 2008); C Rica, STEPS CR 2011

Diabetes is a costly disease.

The cost of diabetes in the United States was estimated at \$245 billion in 2012

In Africa the burden of diabetes was estimated at Int\$25.5 billion in 2000

A previous cost analysis for Latin America & the Caribbean estimated the burden of diabetes at \$65 billion in 2000



Aim



The objective of the present cost of illness study was to estimate the societal cost of diabetes in Latin America and the Caribbean in 2014.

This is a prevalence-based approach study. Prevalence data was used to estimate the direct and indirect costs of diabetes and its complications in 29 countries of Latin America and the Caribbean.

All costs are presented as US2014\$



Aim

This analysis includes direct medical costs

- **medications,**
- **consultations,**
- **hospitalizations and**
- **long-term complications**

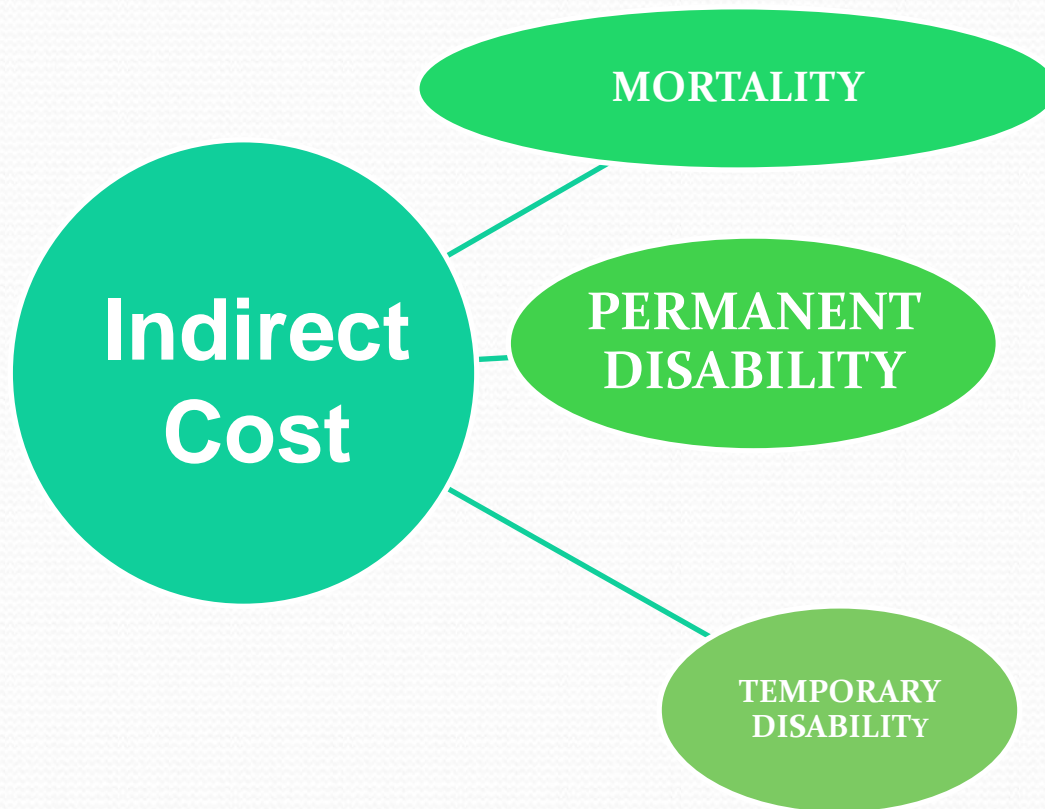
as well as the indirect costs due to

- **premature mortality,**
- **permanent and temporary disability.**

Indirect Cost

Indirect costs included the cost of lost resources due to mortality, and the cost of both temporary and permanent disabilities. These costs were estimated using the human capital approach that uses the present value of future earnings to estimate the burden of mortality and disability





$$PAF = P(RR-1)/1+(P(RR-1))$$

YPLL

GDP

Discounted Future Earnings

Permanent disabled:

- amputations,
- terminal renal disease, blindness,
- cerebrovascular diseases
- infarction

Lost productive days

50% economically active

Number of lost days of work from the ViCent Survey

Estimated indirect cost of diabetes in Latin America & the Caribbean, 2014

Item	Estimate
Populations 20-79 (X10 ³)	385,446
W/diabetes (X10 ³)	34,254
Mortality	
No. of deaths	1,386,513
R/diabetes (40-65 years)	374,920
YPLL	1,960,339
Cost (US\$X10 ⁶)	\$16,934
Permanent Disability	
w/permanently disability	902,879
YPLL	8,616,334
Cost (US\$X10 ⁶)	\$72,657
Cost in 1 year (US\$X10 ⁶)	\$8,823
Temporary Disability	
w/ temporary disability	25,753,121
YPLL	296,134
Cost (US\$X10 ⁶)	\$2,978
Indirect Cost (US\$X10⁶)	\$28,735



Direct Cost



Direct costs comprise health expenses with medications (such as insulin and oral hypoglycemic agents), examinations, consultations, hospitalizations, emergency visits and treatment of complications. The costs of each of these components of health care expenses were estimated using the “bottom-up” approach. Data on the average cost of healthcare services for diabetes in a subpopulation was collected and then extrapolated to estimate the cost of each type of service for the whole population. It was then extrapolated to estimate the cost of each component for the population as a whole.

SOURCE OF INFORMATION	EXTRACTED DATA
Commercial prices of medicines and tests survey	Comercial price of medicines, tests & services obtained from country officials or national diabetes association
ViCent database: Survey exploring use of health resources and missing work days	1,899 patients visiting clinics in six countries (Bolivia, Chile, El Salvador, Guatemala, Honduras and Nicaragua).
Chilean Clinical Record Database	51,795 patient records used to calculate the prevalence of retinopathy, nephropathy, cardiovascular disease, neuropathy and peripheral vascular disease
Database from the National Institute of Public Health in Mexico	Cost of treating each complication of diabetes as a ratio of treating uncomplicated cases of diabetes
PAHO's Basic Indicators	Number of consultations, hospitalizations, length of hospital stay, emergency visits in the general population of each country
Prevalence estimates by age & gender	IDF's diabetes atlas
GDP, NHE	World Bank Database

ITEM	AVERAGE COMERCIAL PRICE	PAHO'S STRATEGIC FUND
	2014US\$	
INSULIN	\$35	\$4.20
METFORMIN	\$17 (x100)	0.89
MEDICAL VISIT	\$36	-
MEDICAL VISIT OFTALMOLIGIST	\$53	
HOSPITAL DAY	\$480	
EMERGENCY ROOM VISIT	\$43	
Rx	\$29	
A1c	\$20	
LIPID PROFILE	\$26	
ALBUMINURIA	\$22	
EKG	\$26	

Direct Cost: healthcare utilization

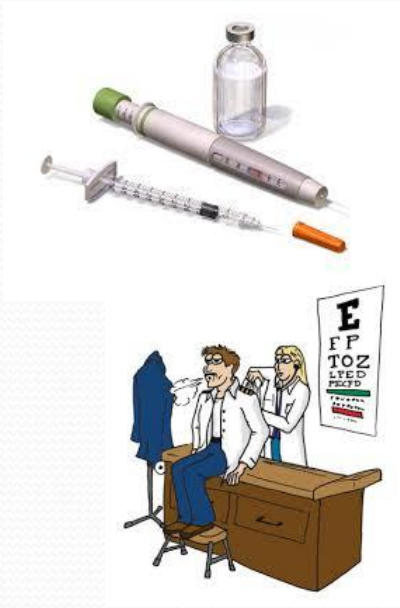
The ViCent questionnaire was applied to a random sample of 1,899 patients visiting clinics in six countries (Bolivia, Chile, El Salvador, Guatemala, Honduras and Nicaragua). The questionnaire explored health care utilization, the presence of diabetes and diabetes-related long-term complications.

	CONSULTATIONS	EMERGENCY VISITS	HOSPITALIZATIONS	LENGHT OF STAY	DAYS
DM COMPLICATIONS	13.7	2.5	0.8	5.6	4.5
DM W/O COMPLICATIONS	10.5	2.1	0.4	3.2	1.2
NON DM	2.5	0.9	0.1	0.2	0.0
GENERAL DM	11.28	2.24	0.5	4.0	2.0

Assumptions

Direct Cost Item	Rationale	Assumption
Annual use of insulin	1,000 u per user	5% of cases
Annual use of metformin	1,500 tablets per user	50% of cases
Health care utilization	Consultations, hospitalization, length of days in the hospital	3.5 more consultations, 7 times more hospitalizations, 2.3 more emergency room visits
Testing	1 A1c, 1 lipid profile, 1 EKG, 1 Rx, 1 proteinuria	55% of cases

Direct Cost



Medication
Insulin
HOA

Emergency
Visits

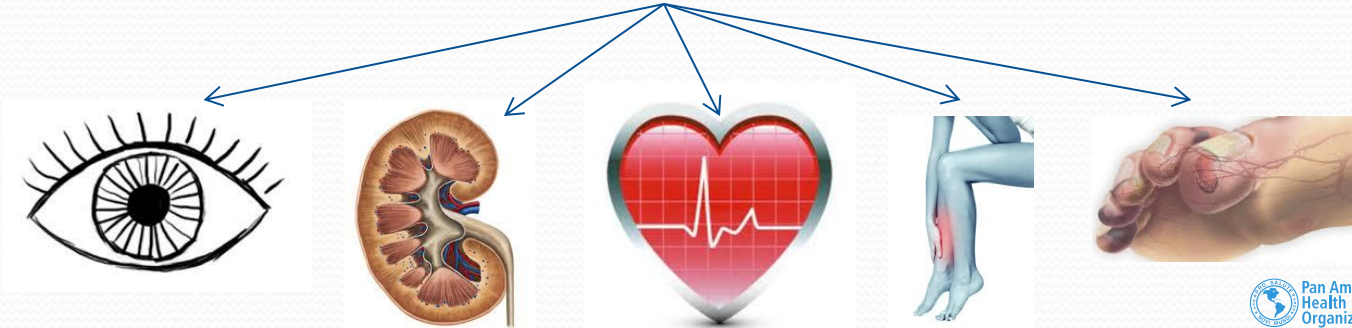


Consultations

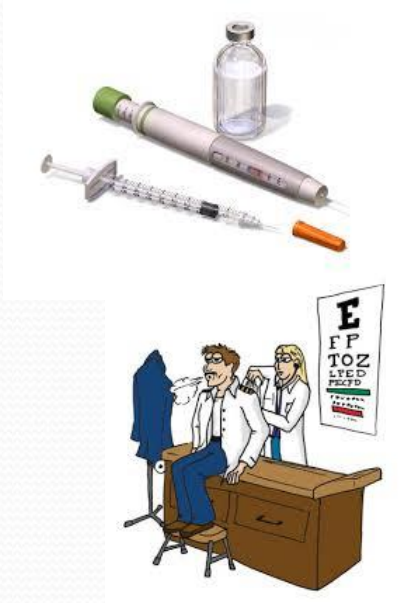
Hospitalizations



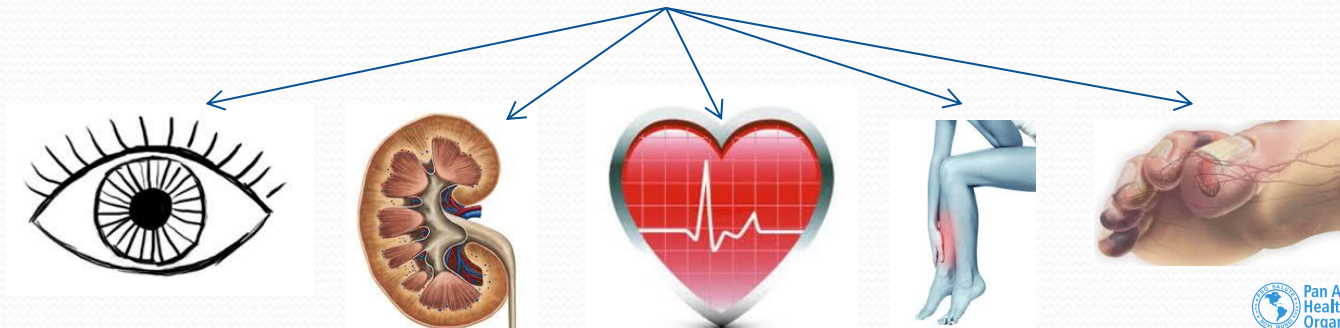
Excess Cost
Caused by
Complications



Direct Cost

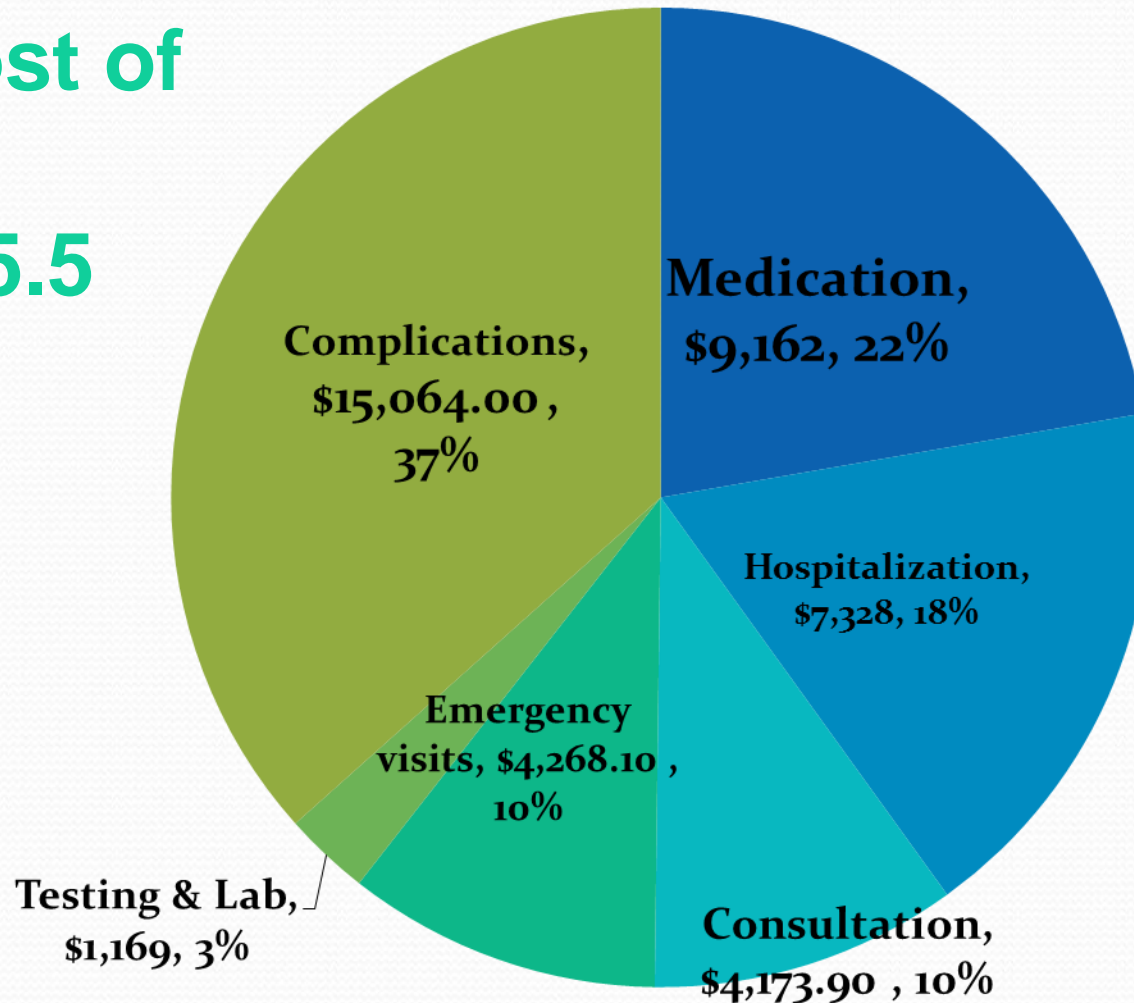


Complications	Probability	Cost Ratio
Retinopathy	0.12	1.09
CVD	0.11	1.23
Nephropathy	0.06	2.35
Neuropathy	0.09	1.08
PVD	0.06	3.35

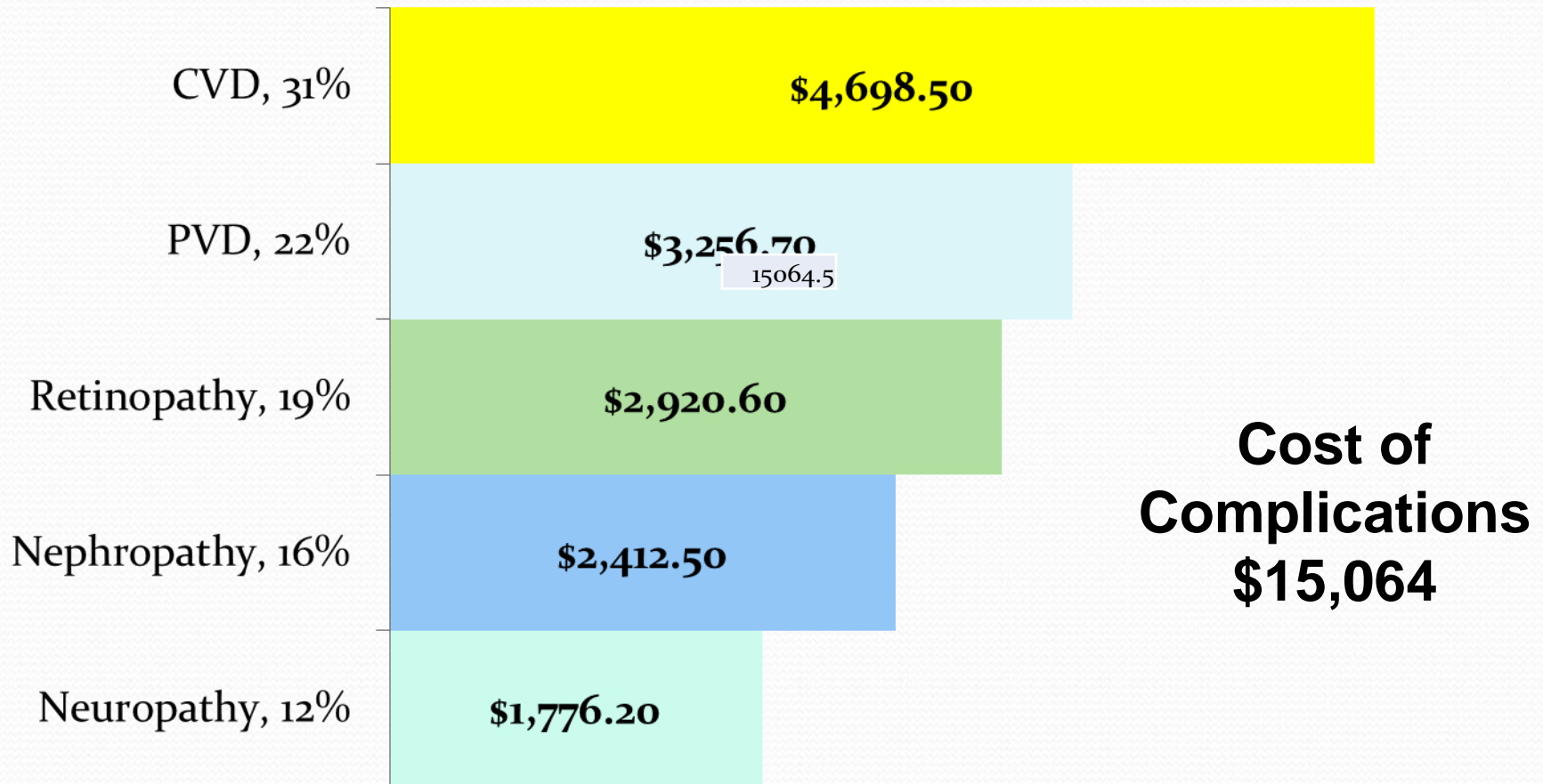


Direct Cost (US\$X10⁶) of Diabetes in Latin America & the Caribbean, 2014

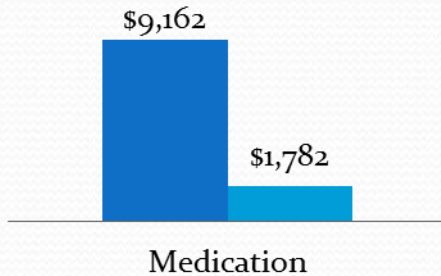
**Estimated
Direct Cost of
DM
\$41,165.5**



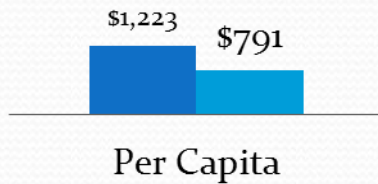
Estimated Cost (US\$X10⁶) of Diabetes Complications in Latin America & the Caribbean



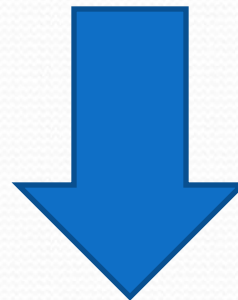
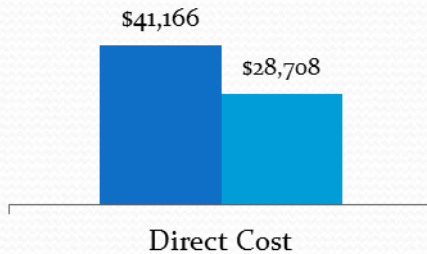
Using PAHO's Strategic Fund Prices for Insulin & Metformin



**Medication:
Reduce Cost in 80%**

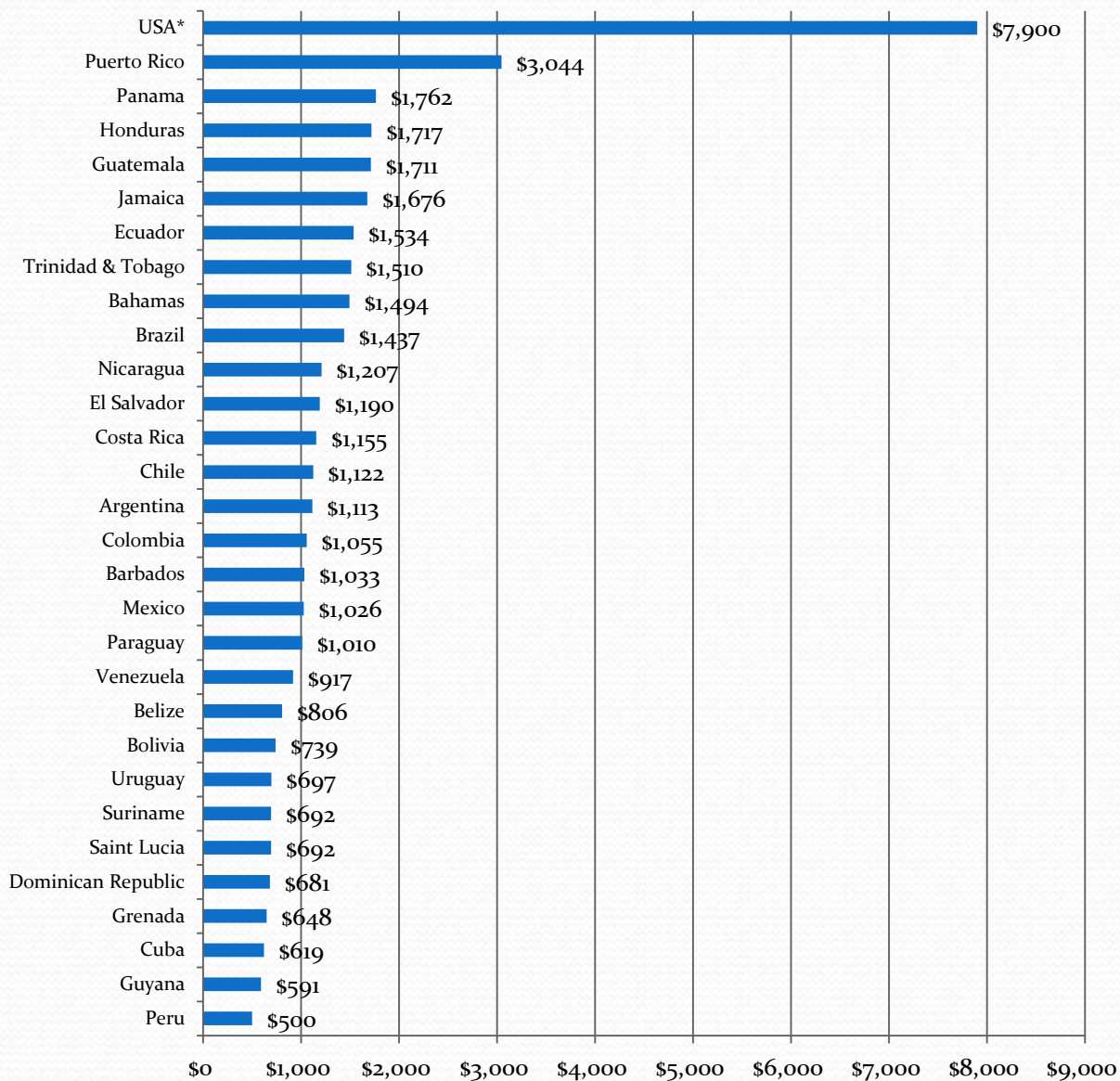


**Per Capita Cost of DM:
Reduce Cost in 35%**



**Direct Cost of DM:
Reduce Cost in 30%**

Estimated annual per capita direct cost (US\$) of diabetes by country in LAC, 2014 and the US 2012

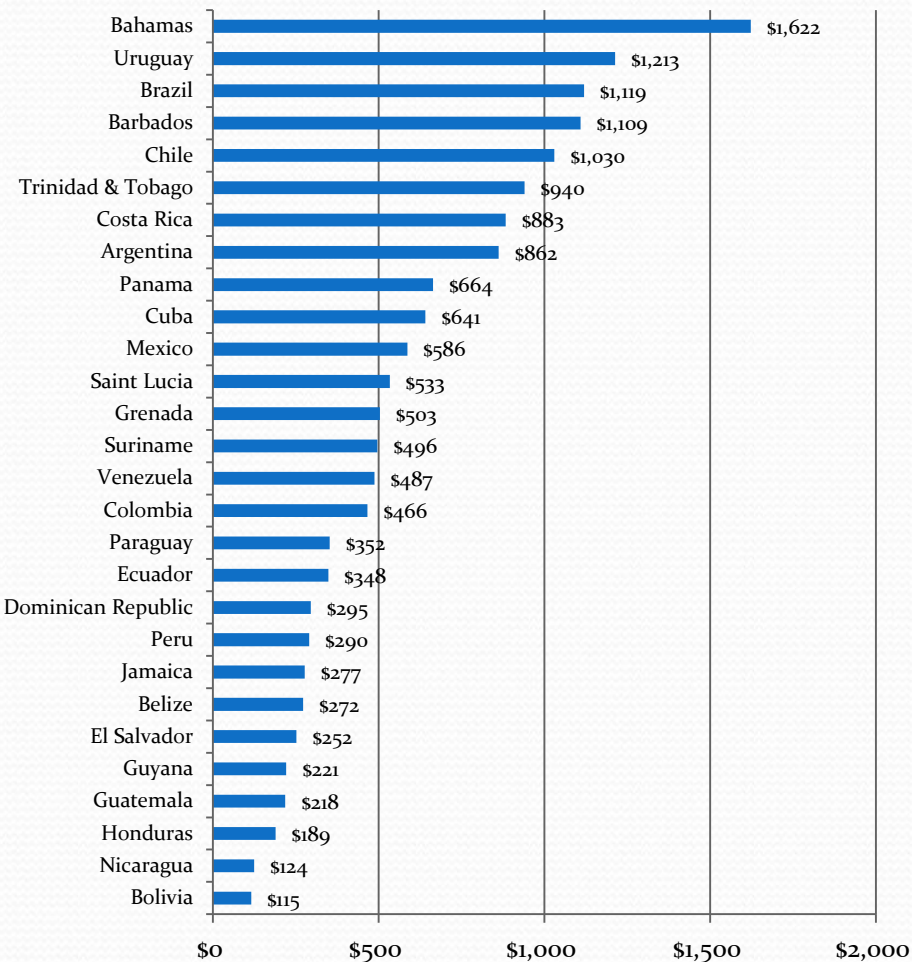


**Average estimated cost
of DM in LAC
\$1,223 per year**



* American Diabetes Association.
Economic Cost of Diabetes in the US in
2012. Diabetes Care 2013;36:1033-1046

National Health Expenditures in Latin America & the Caribbean, 2014



Mean Per Capita Cost of DM US\$1,083*
Mean NHE US\$575
Excess Cost of DM +\$505
Mean NHE (DM) US\$769**

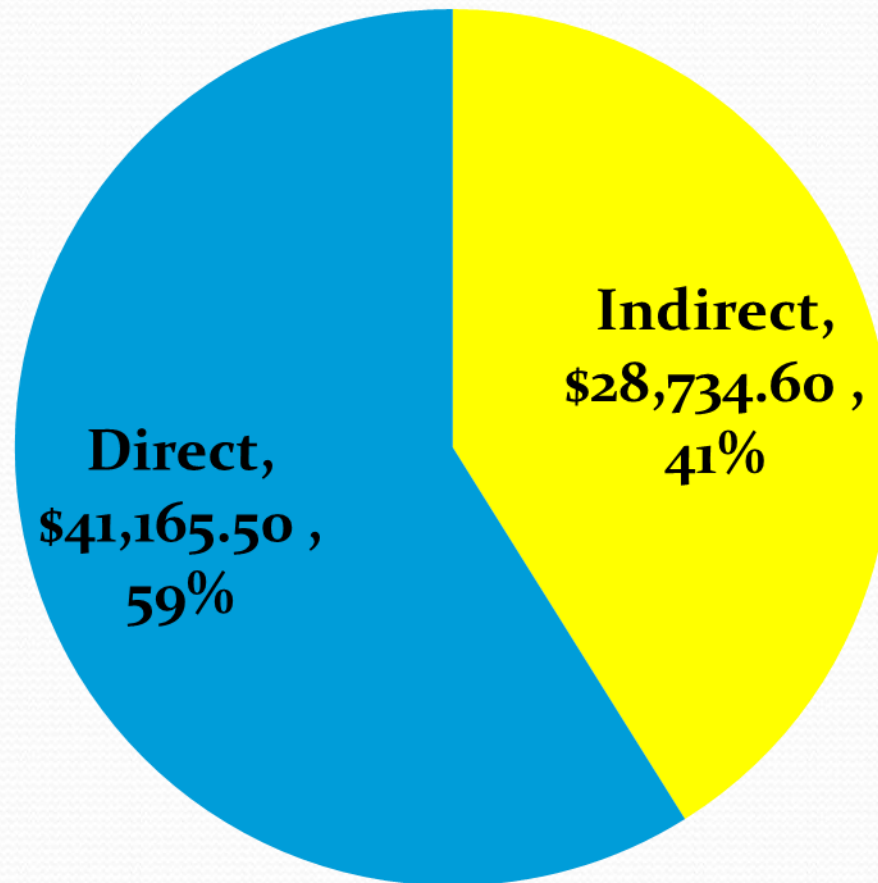


*Excludes Puerto Rico

**Estimated by the IDF Atlas 2013

The Cost (US\$X106) of Diabetes in Latin America & the Caribbean 2014

**Total
estimated
cost of DM
\$69,900.1**



Conclusions

1. Diabetes caused an estimated burden of US\$69 billion in Latin America & the Caribbean in 2014.
2. Between the year 2000 to 2014, the estimated number of people with diabetes increased from 15 million to 34 million.
3. The present analysis showed a 2.3-fold increase of the direct medical cost attributed to diabetes and its complications, as well as a 1.7-fold increase in indirect cost.
4. All-causes total number of death in the LAC accounted for 1,386,513, 27% of which were estimated to be due to diabetes.
5. The number of reported deaths attributed to diabetes in Latin America and the Caribbean for the most recent available year was 184,803 which mean that vital statistics may underestimate diabetes as an underlying cause of death in almost 50%.
6. In most countries the per capita cost of diabetes may exceed the amount of money expended in health care

Healthy Lifestyle **Diabetes**

THE PREVENTION AND CONTROL OF DIABETES IS IN YOUR HANDS www.paho.org/diabetes



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