



The burden of type 2 diabetes: why to act for early diagnosis and control

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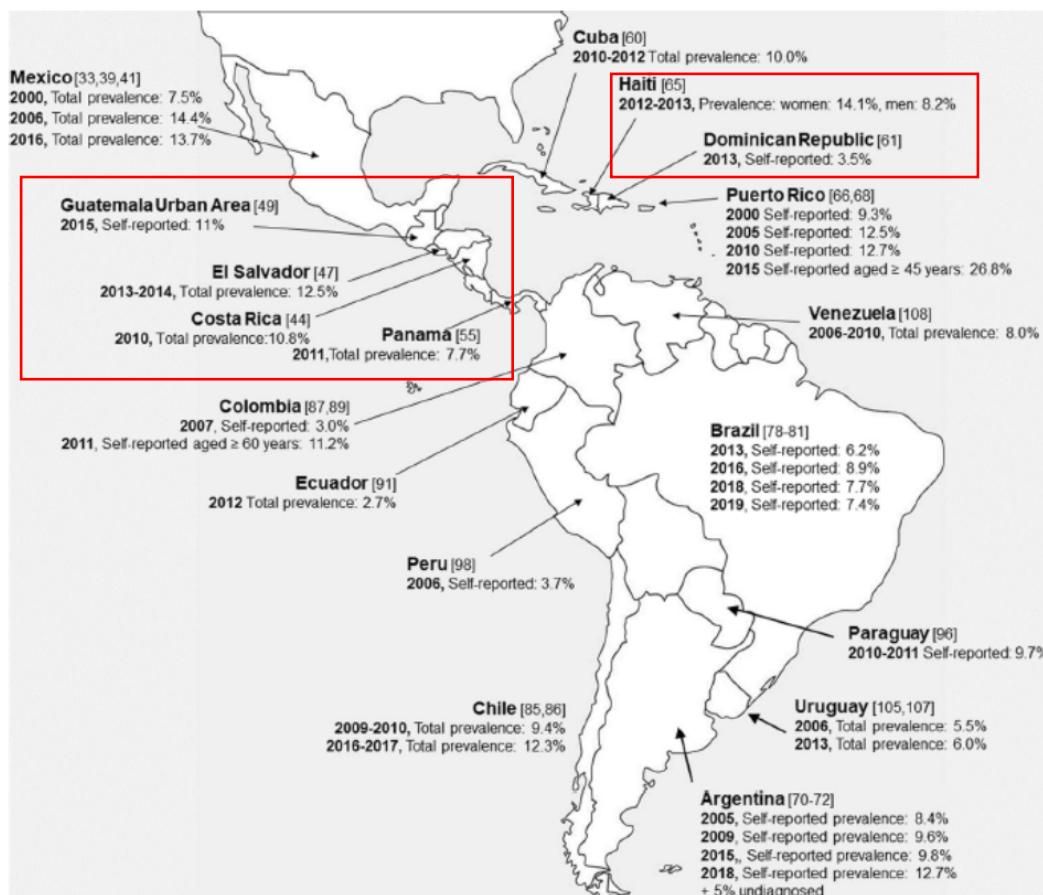
Conflicts of interest (last 5 years)

- Speaker bureau: Astra Zeneca, Abbott Nutrition, Novo Nordisk, Merck Sharp & Dohme, Sanofi Aventis, Bayer, Pfizer, Novartis, Siegfried
- Advisory Board: Sanofi Aventis, Novo Nordisk, Stendhal, Pfizer, Siegfried
- Clinical Research: Astra Zeneca, Novartis Pharma Logistics Inc., Recordati, Novo Nordisk

Introduction

- Latin America and Caribbean countries have the fastest growing prevalence of T2DM in the world
- Highest prevalence in the Caribbean (15%)
- Highest number of patients living with diabetes are in Mexico and Brazil
- In 2019, 31.6 millions of persons with diabetes in Latin America
 - 40.2 millions by 2030
 - 49.1 millions by 2045

Type 2 diabetes prevalence is increasing across our Region and remains a big prevalence of undiagnosed patients



In 2019, 31.6 millions of persons with diabetes in Latin America:

- 40.2 millions by 2030
- 49.1 millions by 2045

Prevalence of undiagnosed diabetes:

- Highest:** Guatemala (48.8%), Uruguay (48.7%), Puerto Rico (37.7-50%),
- Lowest:** Colombia (23.5%), southernmost countries of South America (20.2%) and Costa Rica (10.3-28.4%)
- Awareness increased with educational attainment
- Prevalence higher among women

Why is prevalence of diabetes increasing in Latin America?

- Between 1980 and 2008, BMI has increased by 1 kg/m² per decade in Latin America (twice as fast as the global average)
- Mexico leads the world in sugary drink consumption
- Peru has the highest density of fast food restaurants
- Average Chilean diet includes more than 50% processed foods
- Between 1998-2009 Venezuela had an increase of 27% in their caloric intake



Diabetes in Latin America: treatment

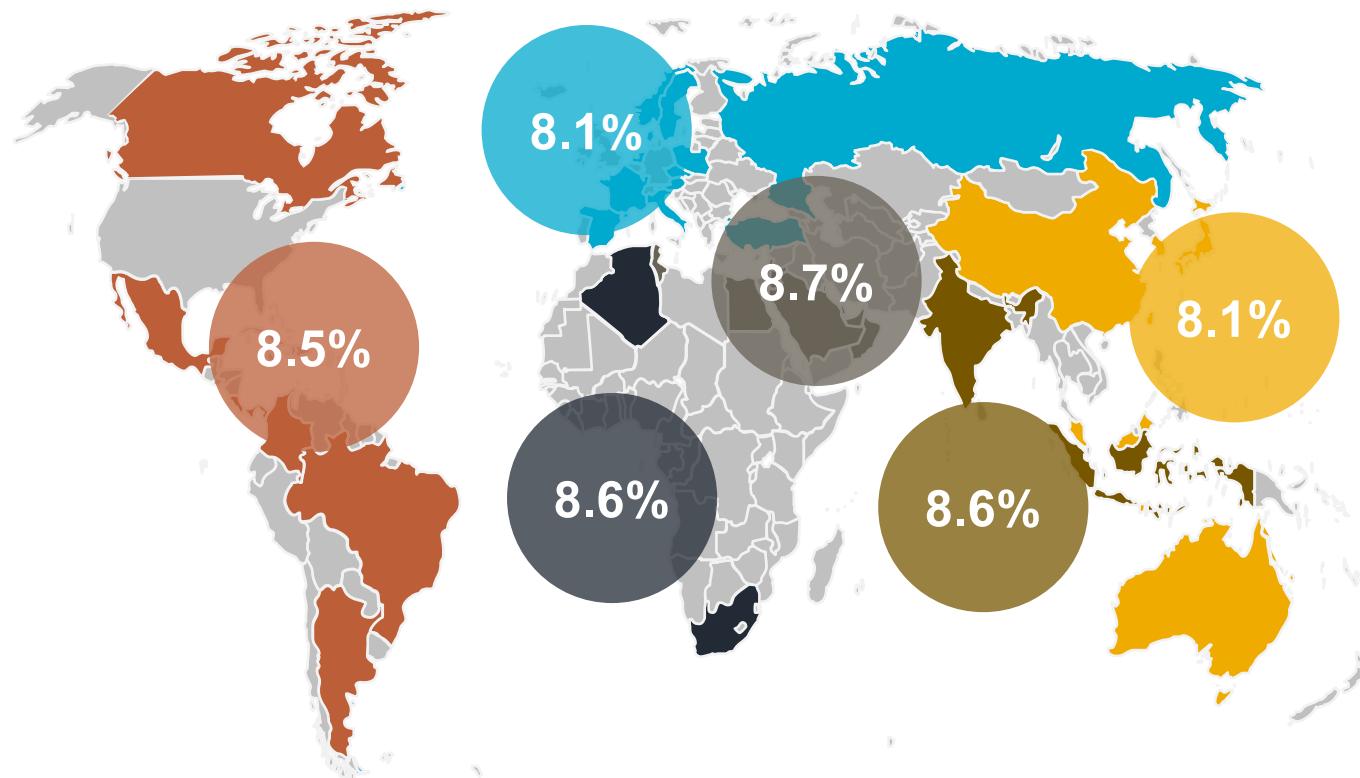
- Patients with diabetes mellitus following any treatment: 52.6-99%
 - 5-12.9% only followed/diet prescription
- Glucose targets:
 - Hba1c <7% 3.5-54%
 - Based on fasting glucose: 31.4-61.4%
 - Attainment of glucose control was associated with higher socioeconomic status, having health insurance, and better access and services
- Blood pressure
 - <130/80 mm Hg: 25-67%
- LDL cholesterol
 - <100 mg/dl: 12-52.6%

DISCOVER Registry

Glucose control by region



- Worldwide mean Hba1c was 8.3%



Time since diagnosis and starting second-line treatment



On average, patients stayed 7.2 years in first-line therapy and the most common drugs were MET (83.1%) or SU (9.9%) monotherapy

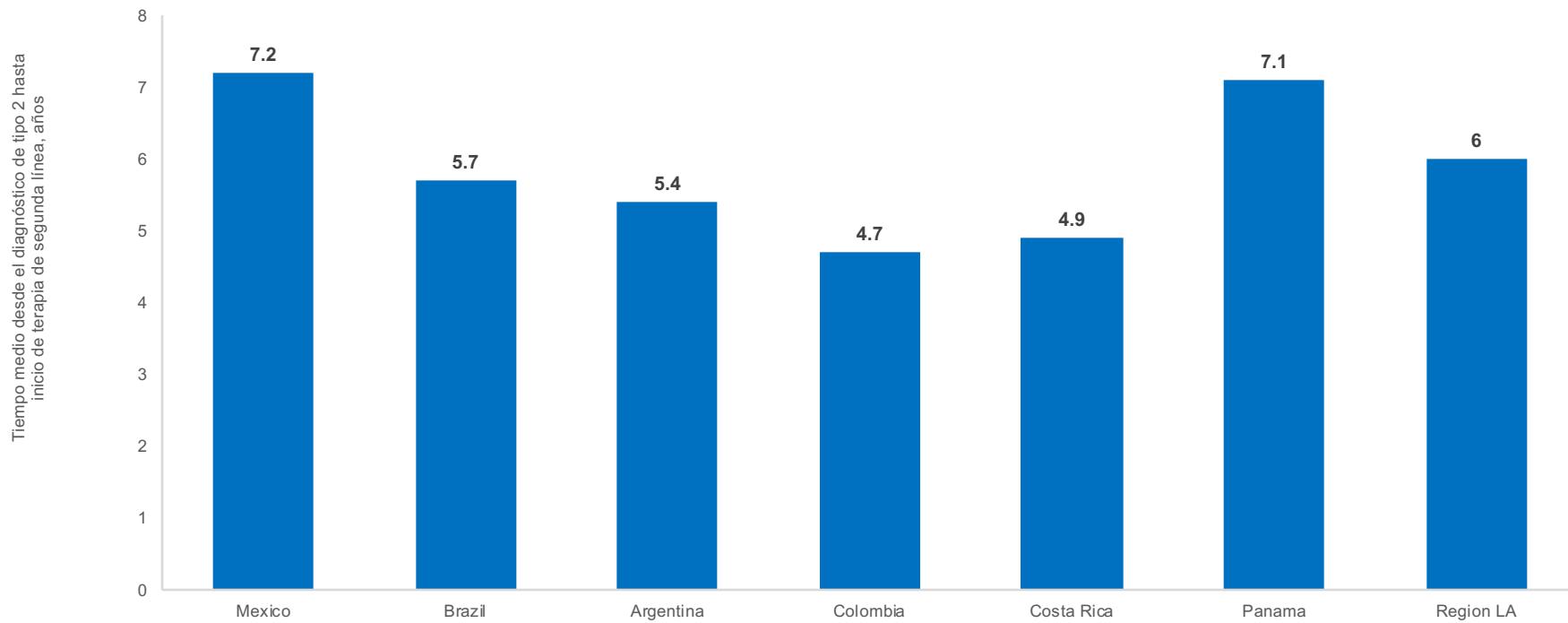


Table 2. Baseline laboratory results of patients in the DISCOVER-LA study by country or region

Characteristic	Central America*	México [mean ± SD]	Colombia [mean ± SD]	Argentina [mean ± SD]	Brazil [mean ± SD]
Baseline HbA1c (%)	7.7 ± 1.8	8.9 ± 1.6	8.4 ± 2.1	8.8 ± 1.9	8.4 ± 1.9
<7	54 (32.7%)	14 (5.6%)	36 (20.2%)	33 (12.8%)	58 (14.4%)
7-10	95 (58.4%)	176 (70.7%)	110 (61.8%)	162 (63.0%)	279 (69.1%)
>10	14 (8.8%)	59 (23.7%)	32 (18.0%)	62 (24.1%)	67 (16.6%)
Total Cholesterol high(>180mg/dL)	50 (54.0%)	99 (50.5%)	72 (51.8%)	118 (57.3%)	139 (47.3%)
HDL low (<40M/50W)	54 (58.1%)	78 (72.9%)	82 (60.3%)	85 (49.1%)	156 (55.3%)
LDL high(>70 mg/dL)	78 (82.3%)	92 (84.4%)	70 (72.2%)	133 (89.9%)	211 (79.0%)
Triglycerides (mg/dL)	186.6 ± 131	209.8 ± 151.7	191.3 ± 136.3	180.4 ± 98.5	187.0 ± 127.1
Serum creatinine	0.9 ± 0.4	1.3 ± 2.0	1.2 ± 1.5	1.2 ± 1.4	1.0 ± 0.9



Risk factor control in Costa Rica and Panama: results from DISCOVER

	Costa Rica (n=127)		Panama (n=92)		p-Value
	Missing n (%)	n (%)	Missing n (%)	n (%)	
HbA1c>7% (53 mmol/mol)	25 (32.5)	67 (65.6)	31 (23.5)	42 (68.8)	0.6
Blood pressure >130/90 mm Hg	15 (16.8)	29 (25.8)	14 (12.2)	40 (51.3)	0.0003
Total cholesterol >180 mg/dL	64 (69.6)	26(41.3)	56 (50.4)	24 (66.7)	0.01
HDL <40M/50W mg/dL	66 (72.5)	34 (55.7)	59 (52.5)	20 (60.6)	0.2
LDL >70 mg/dL	68 (72.5)	50 (84.7)	57 (52.5)	28 (80.0)	0.3



Why is it important to act early
and try to achieve glucose control?

Legacy Effect of Earlier Glucose Control

After median 8.5 years post-trial follow-up

Aggregate Endpoint		1997	2007
Any diabetes related endpoint	RRR:	12%	9%
	P:	0.029	0.040
Microvascular disease	RRR:	25%	24%
	P:	0.0099	0.001
Myocardial infarction	RRR:	16%	15%
	P:	0.052	0.014
All-cause mortality	RRR:	6%	13%
	P:	0.44	0.007

RRR = Relative Risk Reduction, P = Log Rank

Sus pacientes pueden ser más exitosos con la combinación temprana, en comparación a agregar vildagliptina más tarde ⁹

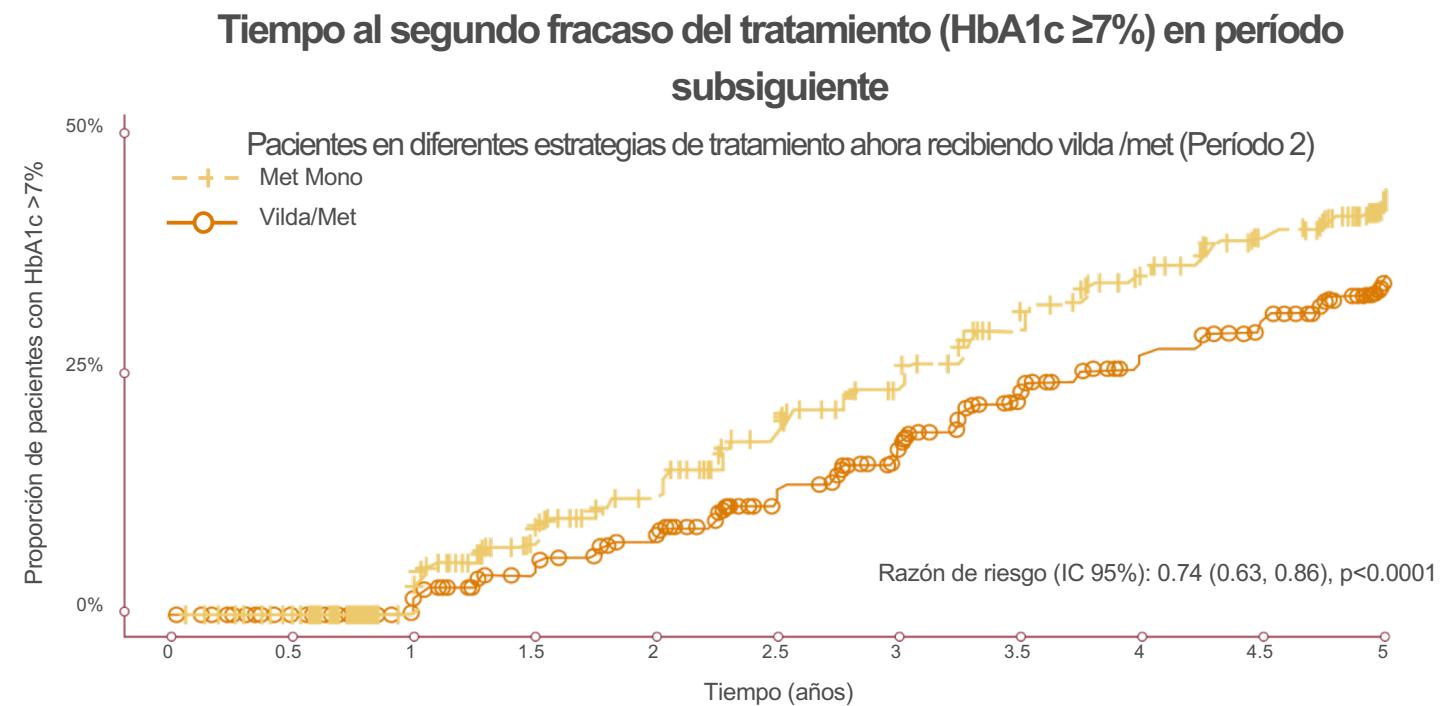
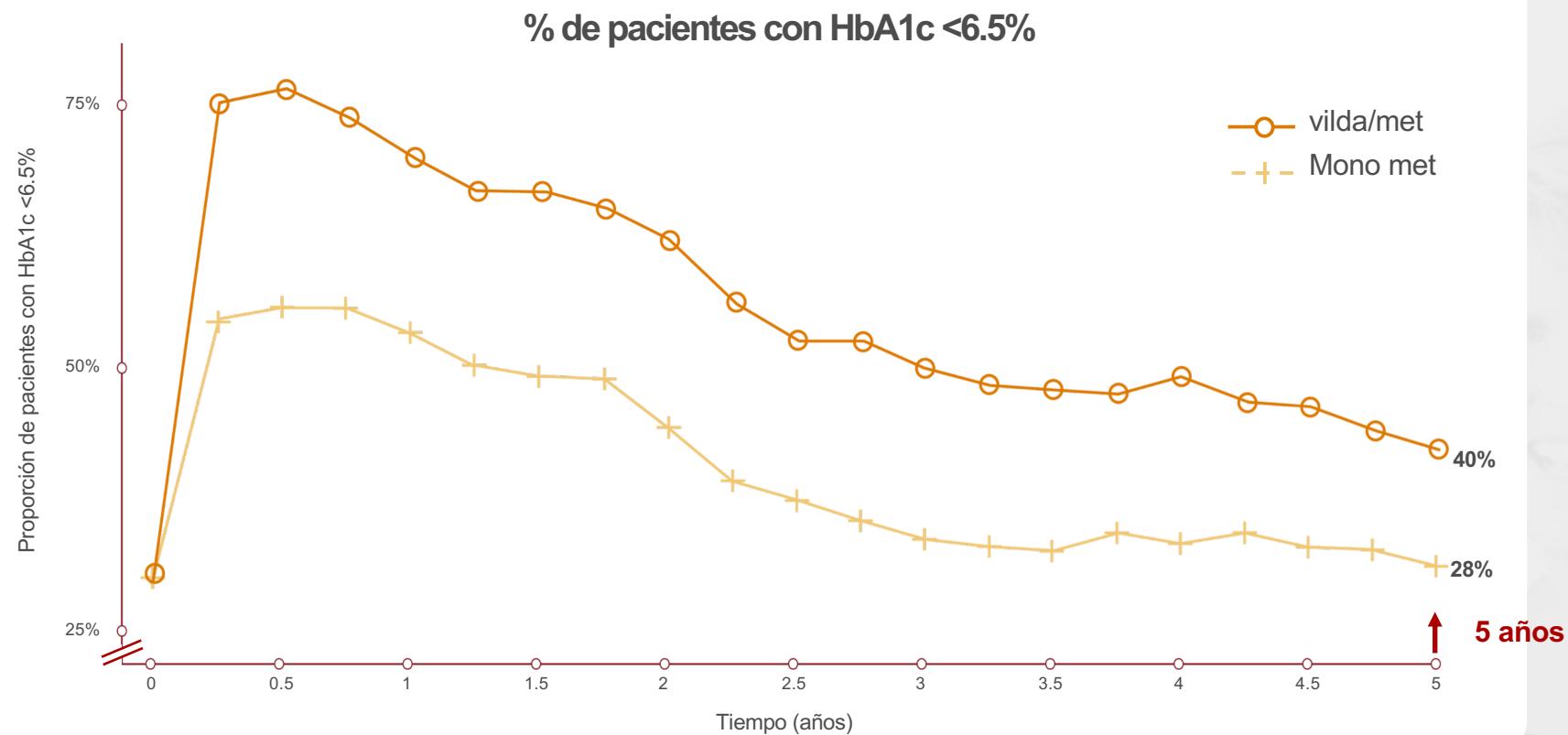


Gráfico adaptado de la referencia 9; Análisis utilizando el conjunto de datos de análisis completo. Análisis de regresión de Cox

Mathews DR. Lancet. 2019;394:1519

La estrategia temprana de combinación permite a más pacientes lograr continuamente los niveles pre-diagnóstico de HbA1c durante 5 años

10

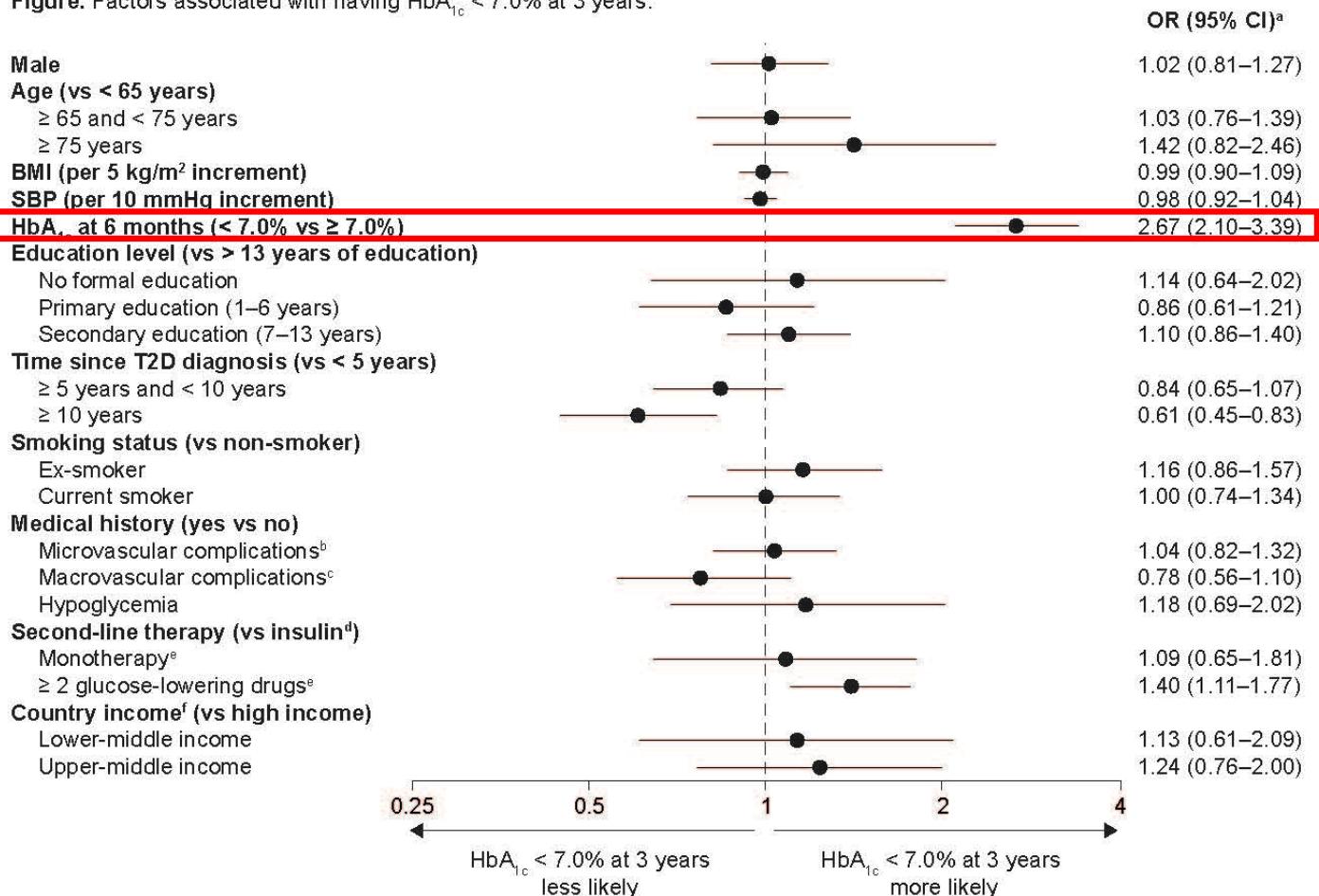


*Los porcentajes dados son las mejores estimaciones de la representación gráfica de los datos en la referencia 9; gráfica adaptada de la referencia 10

Mathews DR. Lancet. 2019;394:1519

Early glucose control predicts long term control

Figure. Factors associated with having $\text{HbA}_{1c} < 7.0\%$ at 3 years.

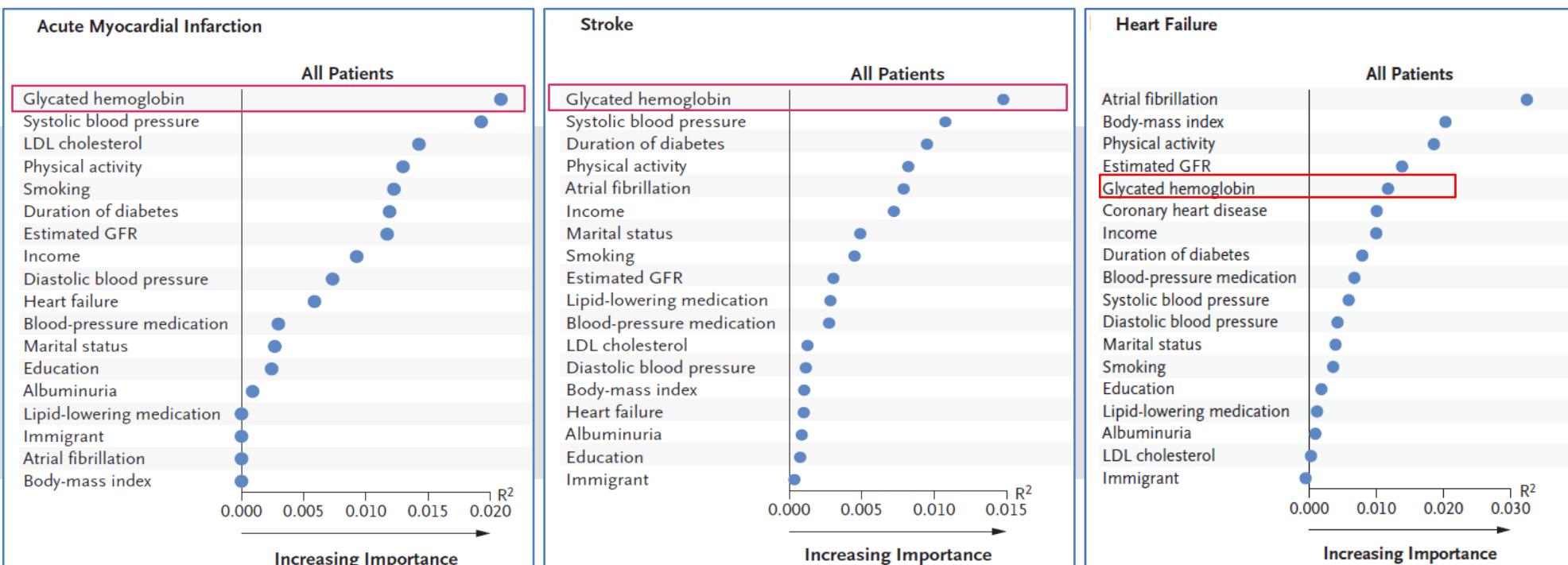


^aORs estimated using a hierarchical regression model adjusted for all variables in the figure. ^bIncludes nephropathy, retinopathy and neuropathy. ^cIncludes coronary heart disease, cerebrovascular disease, peripheral artery disease, heart failure and implantable cardioverter defibrillator use. ^dOn its own or as part of a combination therapy.

^eExcludes insulin. ^fCountry income estimated using gross national income per capita as reported by World Bank (lower-middle income: US\$1005–3995; upper-middle income: US\$3956–12 235; high income: ≥ US\$12 236).

BMI, body mass index; CI, confidence interval; HbA_{1c} , glycated hemoglobin; OR, odds ratio; SBP, systolic blood pressure; T2D, type 2 diabetes.

Uncontrolled HbA1c is the main risk factor for developing CV complications related to diabetes



Cohort study

N=271,174 T2D vs 1,355,870 controls

Follow-up: 5.7 years

Primary objective : To evaluate the association between the excess risks of death and CV outcomes in patients with T2D

Aidin Rawshani, et al. Risk Factors, Mortality, and Cardiovascular Outcomes in Patients with Type 2 Diabetes. N Engl J Med . 2018 Aug 16;379(7):633-644.



As higher is the HbA1c level, the higher the risk and the cost of diabetes related complications

Annual probability of suffering a diabetes-related complication by HbA1c level and estimated cost¹

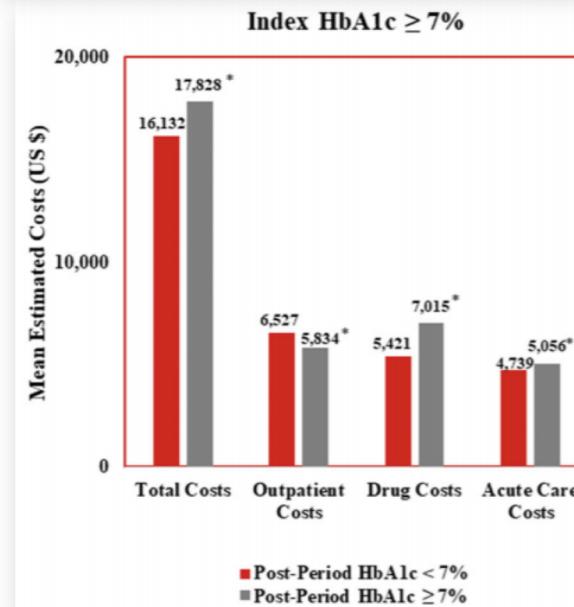
			Nivel de HbA1c				Costo estimado de la complicación en miles de USD
	< 6%	6-7%	7-8%	8-9%	9-10%	> 10%	
Accidente cerebrovascular	0.4%	0.7%	0.8%	0.7%	0.7%	1.2%	22.4
Nefropatía	0.6%	0.6%	1.3%	1.9%	2.5%	6.3%	7.4
Ataque cardiaco	2.2%	3.0%	4.3%	5.3%	8.0%	9.6%	21.7
Amputación	0.1%	0.1%	0.3%	0.4%	1.1%	1.2%	12.7
Cataratas	0.4%	0.5%	0.5%	0.7%	0.7%	1.4%	4.6
Glaucoma	2.0%	2.7%	3.7%	4.2%	5.7%	7.0%	5.6
Retinopatía	2.3%	3.1%	4.2%	4.7%	6.6%	8.0%	4.2
Coma diabético	0.8%	1.1%	1.5%	1.7%	2.4%	2.9%	4.4
Neuropatía	0.3%	0.9%	1.3%	2.0%	4.5%	0.3%	3.1
Muerte	0.9%	1.2%	2.0%	2.4%	3.0%	3.3%	77.2
Úlceras	1.1%	1.5%	2.0%	2.2%	3.1%	3.7%	3.4

Adaptada de Stratton, et al., 2000⁵, Barraza-Lloréns, et al., 2013⁶ y Roche²³.

The relationship between HbA1c reduction and healthcare costs among patients with type 2 diabetes: evidence from a U.S. claims database

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Conclusion: Results suggest that there are economic benefits associated with HbA1c reduction and that these benefits are seen for all patients with T2D and for patients whose index HbA1c is above the American Diabetes Association recommended target.

Conclusions

- T2DM prevalence is increasing in Latin America
- BMI is increasing rapidly in Latin America
- Most patients in Latin America are not reaching glucose, blood pressure or lipid targets
- Early glucose control translates into prevention of complications, a longer duration of glucose control and a lower cost on the long term

Questions...

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