Epidemiología de la Diabetes de Tipo 1

Seminarios en línea sobre diabetes

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Coordinadora Doctorado en Epidemiología
Facultad Nacional de Salud Pública
Universidad de Antioquia

Esta presentación está dedicada con consideración y respeto a los niños y niñas, adultos, familias y comunidades que tienen la experiencia de vivir con Diabetes

Contenido

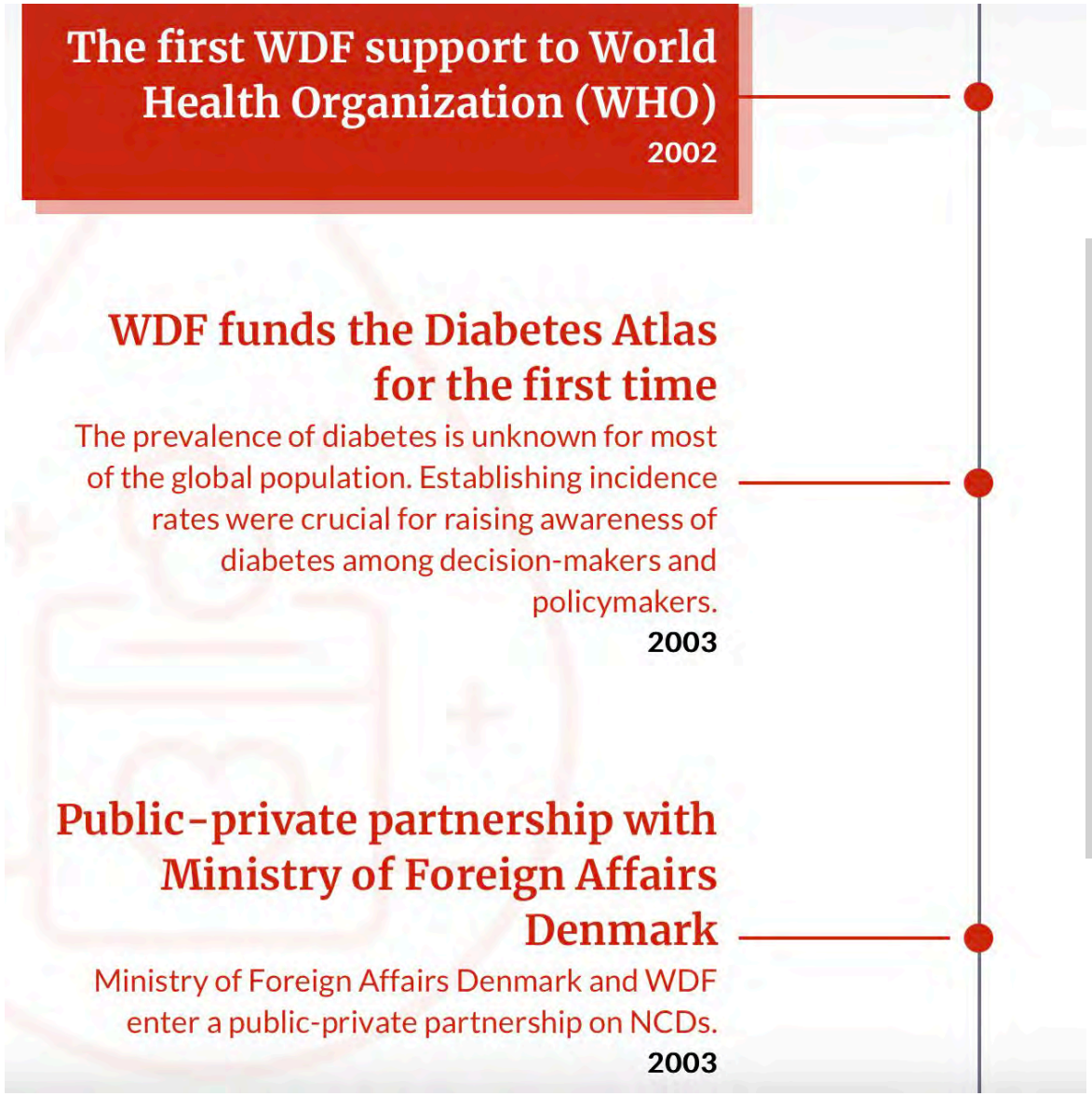
- Generalidades de la diabetes
- Incidencia global de diabetes tipo 1
- Breves notas sobre etiología
- DT1 en adultos
- Algunos métodos analíticos
- Desafíos actuales

Sistemas basados en registros de salud electrónicos: Una oportunidad para conocer ...

En el estudio se desarrolló un método basado registros electrónicos de salud que estima la prevalencia de diabetes tipo 1 en niños y adolescentes entre diferentes grupos raciales y étnicos mediante el uso de EHR.

Analizando la información de OneFlorida+ Clinical Research Network (CRN) que cubre más del 60% de los residentes de Florida

Piaopiao Li, MS. Journal of the American Medical Informatics Association, 2024, Vol. 31, No. 1



¡La prevalencia de diabetes es desconocida para la mayoría de la población global!

¡Conocer las tasas de incidencia es crucial para la toma de decisiones en salud!

Fuente: https://worlddiabetesfoundation.org/what-we-do/wdf-s-impact-journey/

Epidemiología

DIABETES RESEARCH AND CLINICAL PRACTICE 157 (2019) 107842

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Contents available at ScienceDirect

Diabetes Research and Clinical Practice

journal homepage: www.elsevier.com/locate/diabres

International Diabetes Federation

Worldwide estimates of incidence, prevalence and mortality of type 1 diabetes in children and adolescents: Results from the International Diabetes Federation Diabetes Atlas, 9th edition

Christopher C. Patterson [a,b,*], *Suvi Karuranga* [c], *Paraskevi Salpea* [c], *Pouya Saeedi* [c], *Gisela Dahlquist* [d], *Gyula Soltesz* [e], *Graham D. Ogle* [f]

Tomado de: Christopher C. Patterson et al. Worldwide estimates of incidence, prevalence and mortality of type 1 diabetes in children and adolescents: Results from the International Diabetes Federation Diabetes Atlas, 9th edition.

Distribution of type 1 diabetes

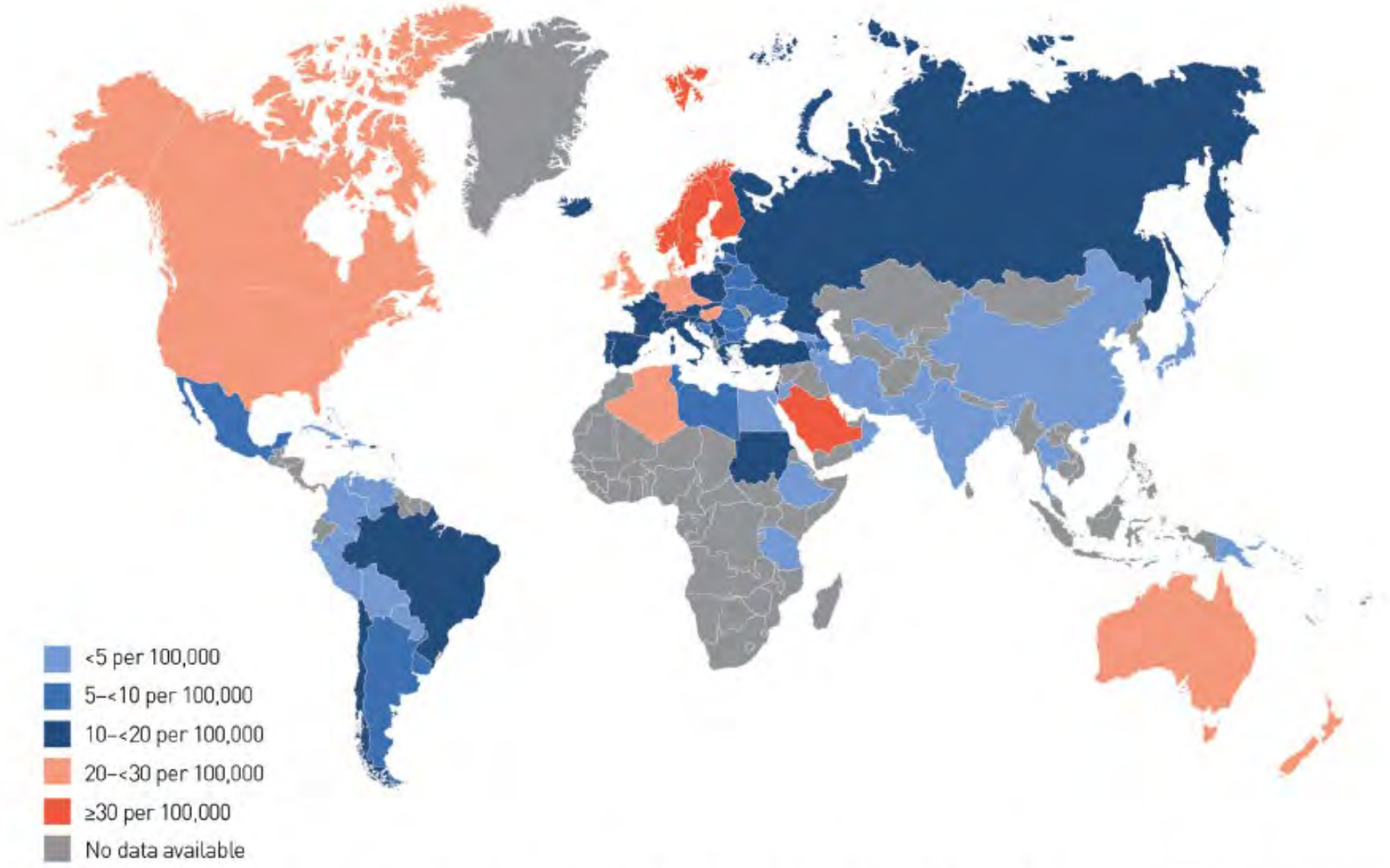
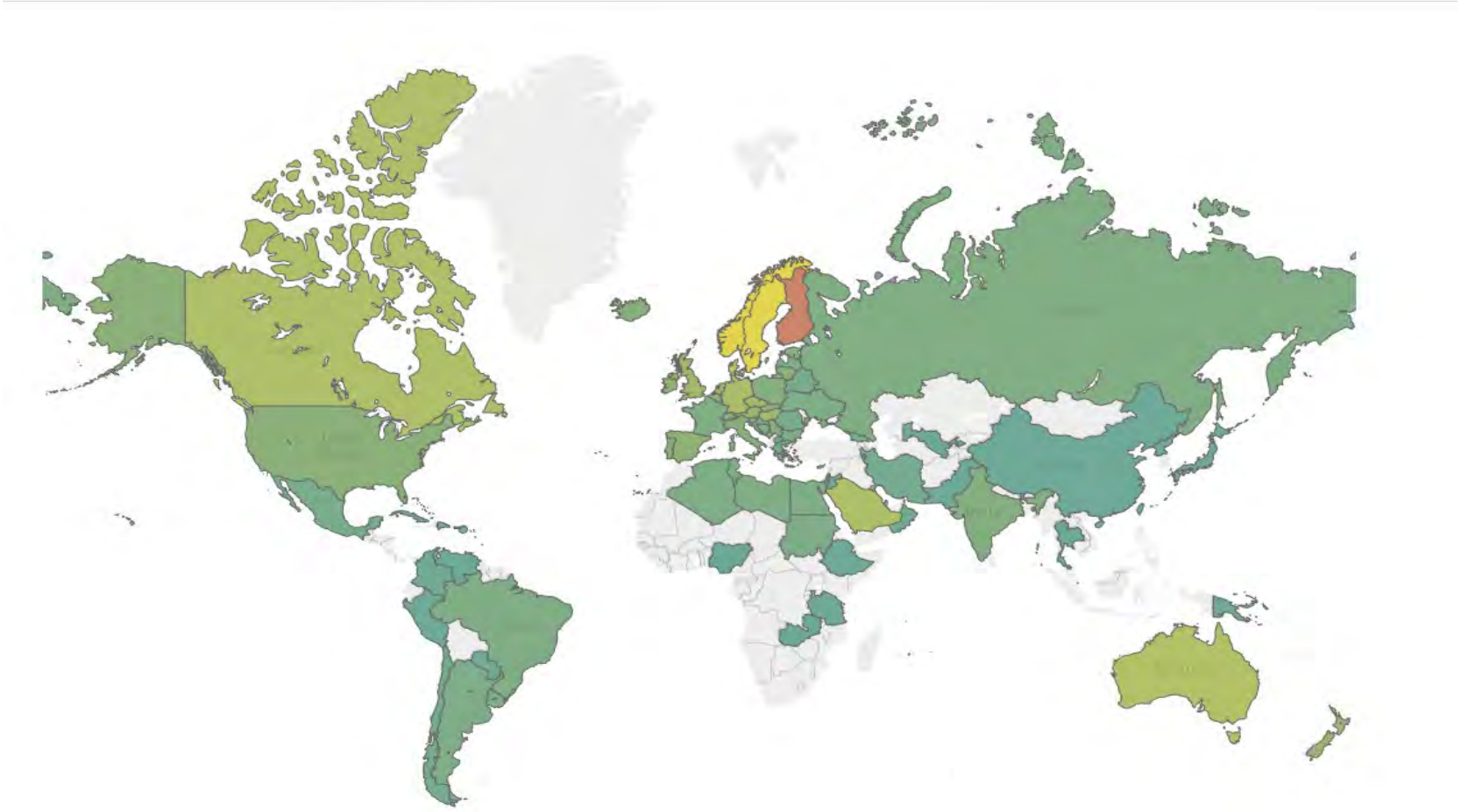


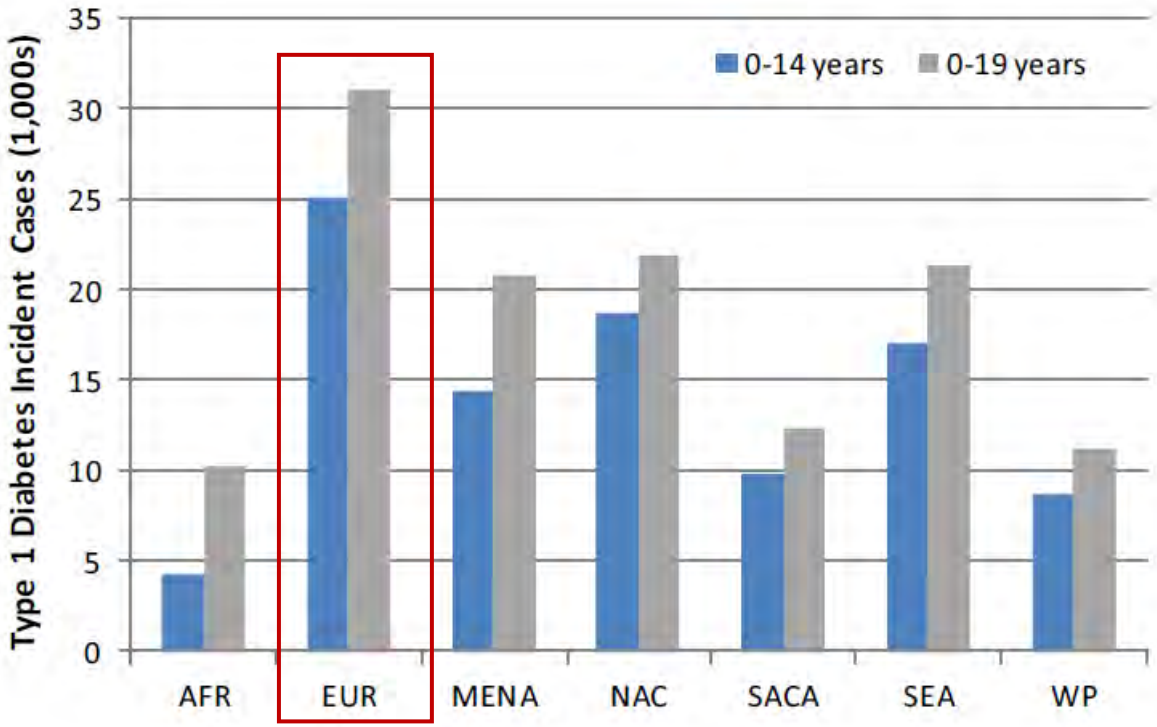
Fig. 1 – Map of age-sex standardised incidence rates (per 100,000) from publications of type 1 diabetes in children aged under 15 years.

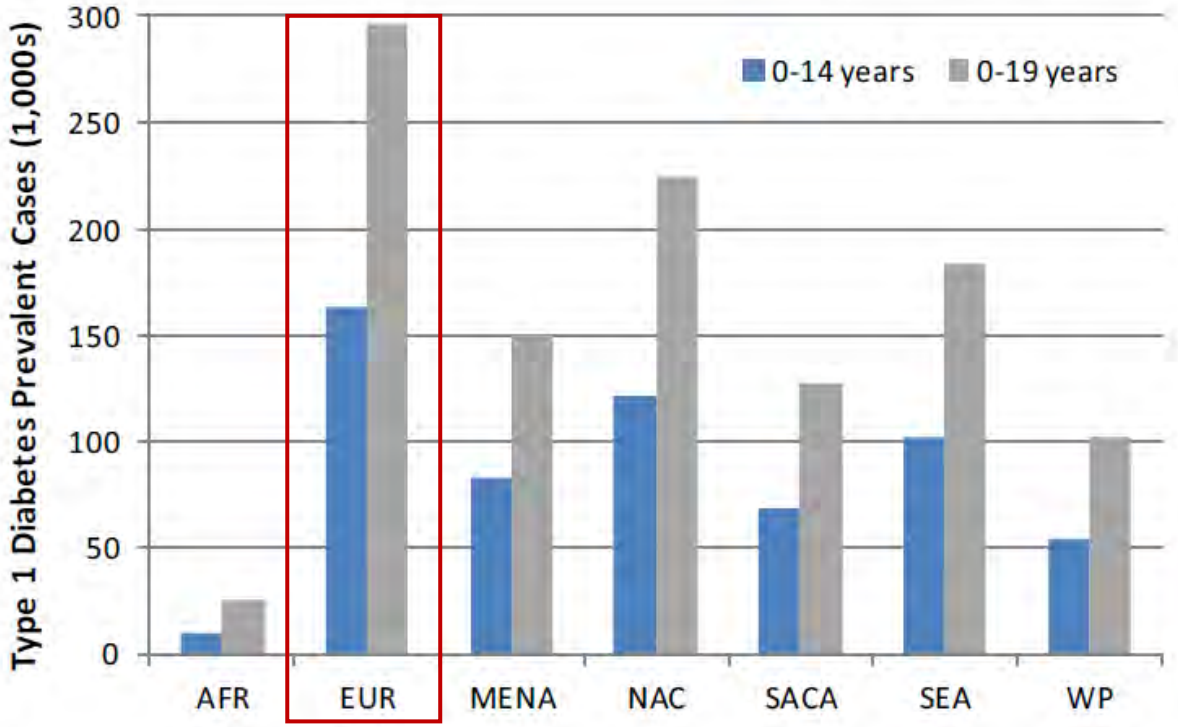
Christopher C. Patterson et al. Worldwide estimates of incidence, prevalence and mortality of type 1 diabetes in children and adolescents: Results from the International Diabetes Federation Diabetes Atlas, 9th edition.



Geographical distribution of countries where T1D incidence has been reported in the literature 1975-2014 . Mean T1D incidence per 100.000 individuals aged 0-14 years per year is in color gradient.

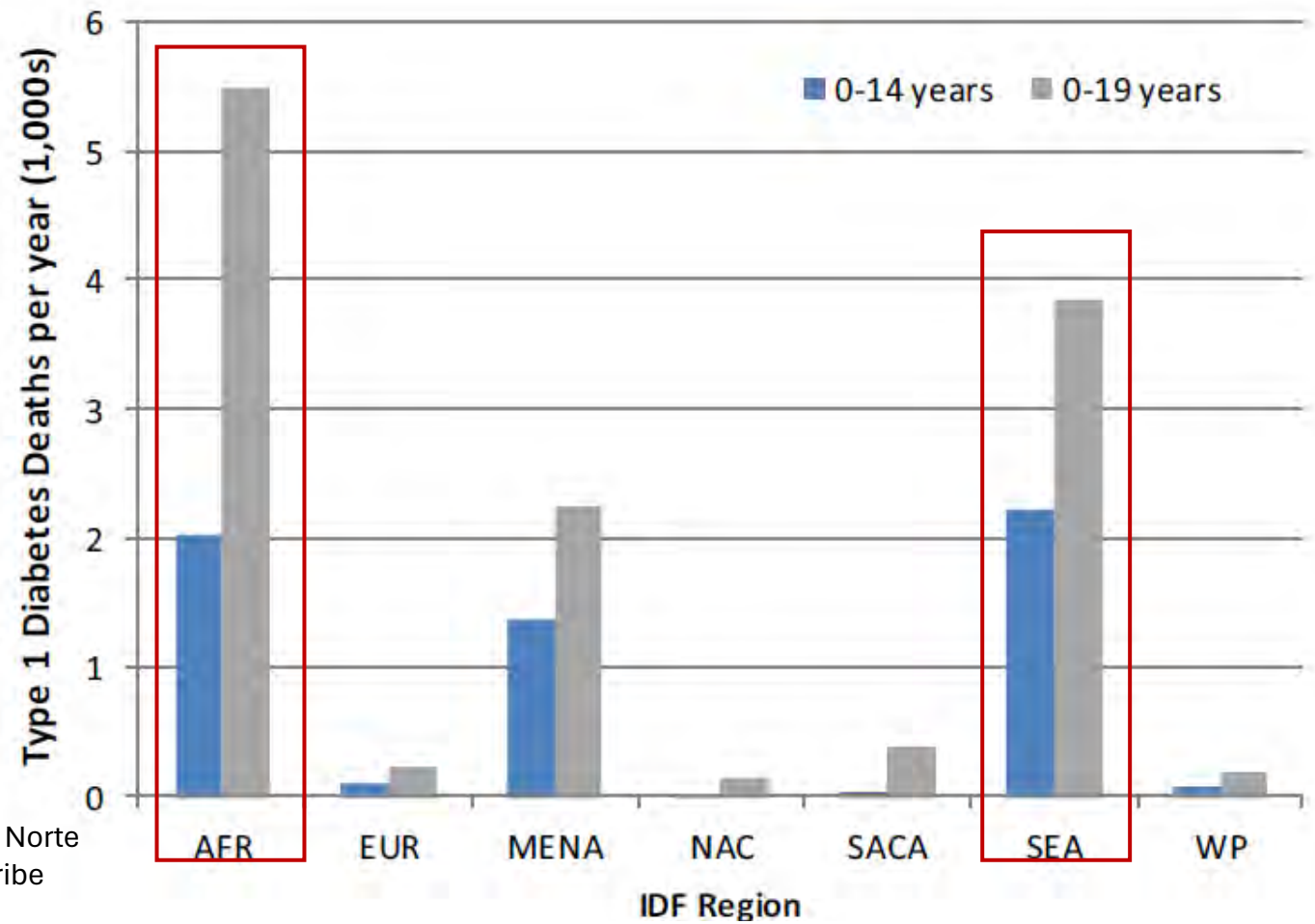
Epidemiologia Diabetes tipo 1





Tomado de: Christopher C. Patterson et al. Worldwide estimates of incidence, prevalence and mortality of type 1 diabetes in children and adolescents: Results from the International Diabetes Federation Diabetes Atlas, 9th edition.

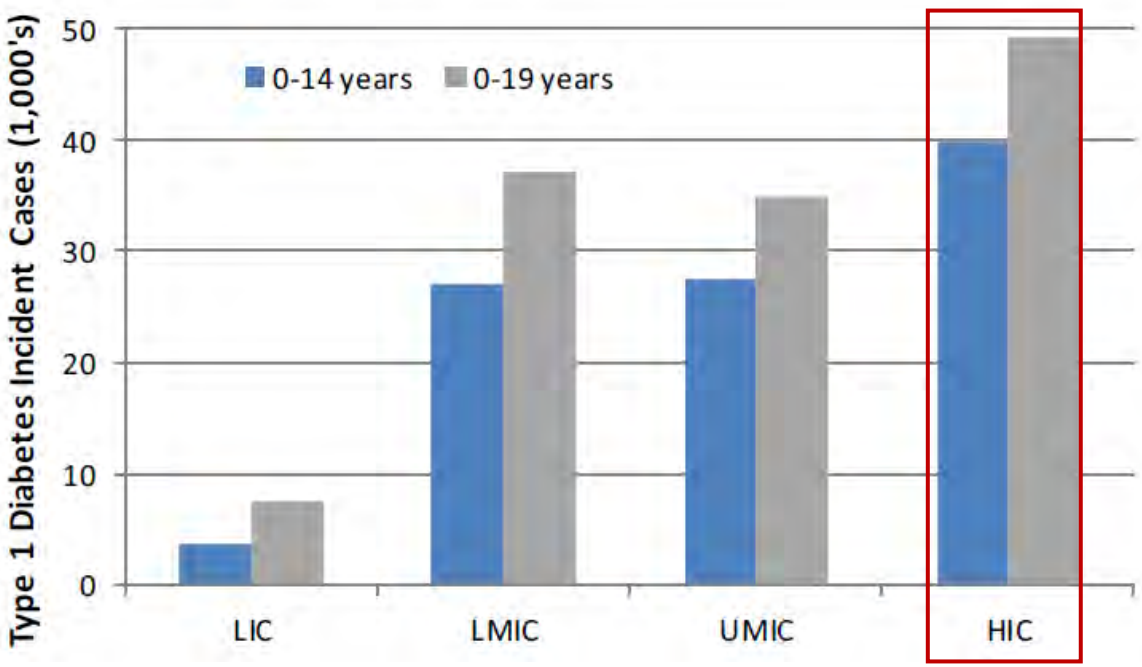
Epidemiologia Diabetes tipo 1

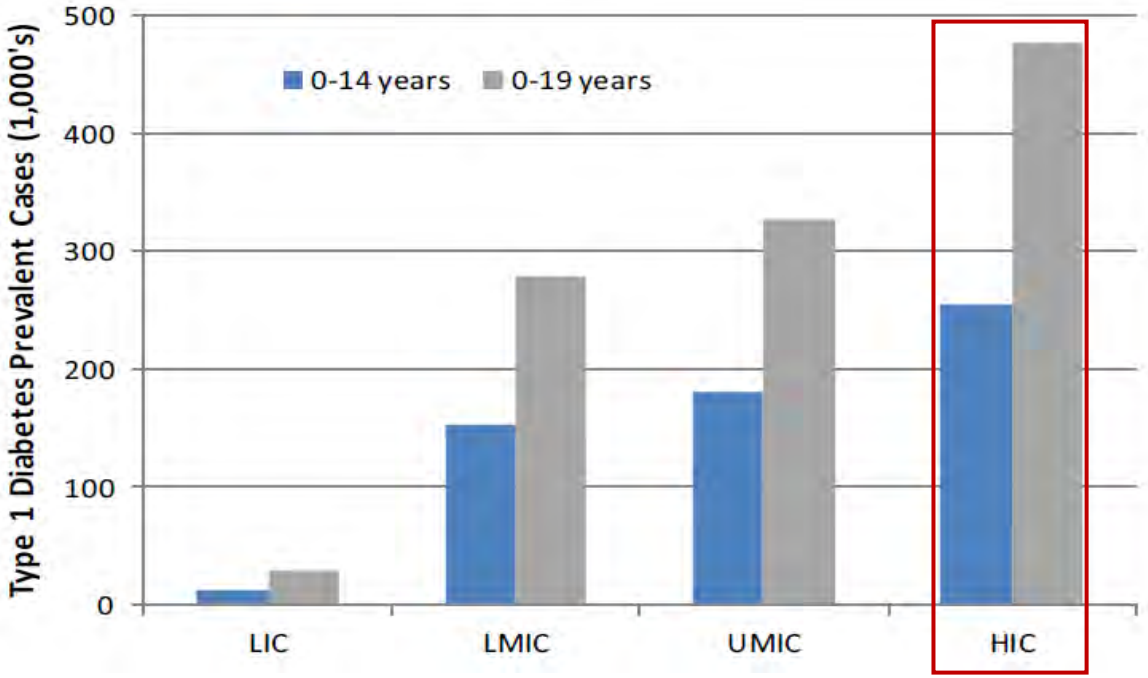


África
Europa
Región de Medio Oriente y África del Norte
Región de América del Norte y el Caribe
Región de América del Sur y Central
Región de Asia Sudoriental

Tomado de: Christopher C. Patterson et al. Worldwide estimates of incidence, prevalence and mortality of type 1 diabetes in children and adolescents: Results from the International Diabetes Federation Diabetes Atlas, 9th edition.

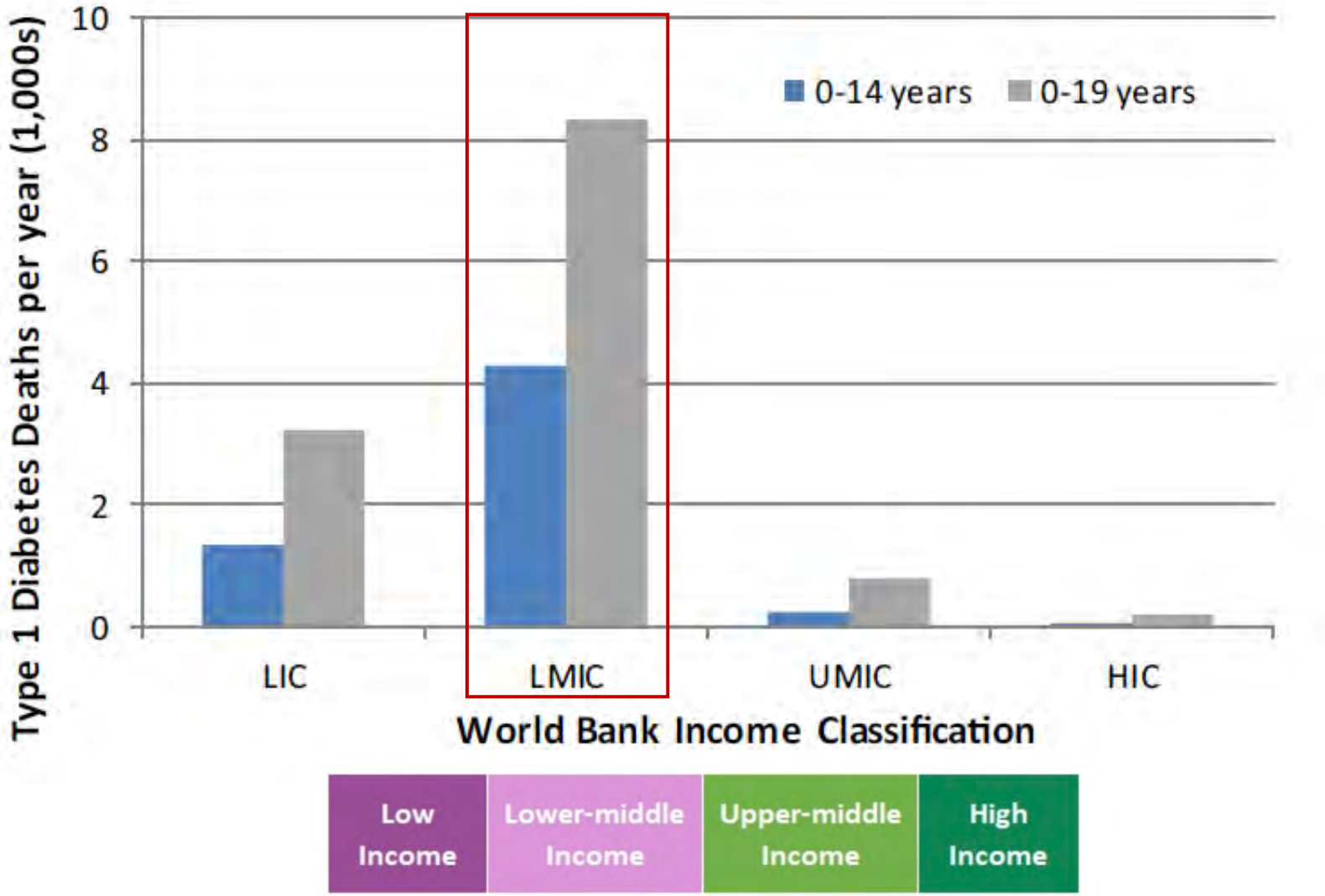
Epidemiologia Diabetes tipo 1





Tomado de: Christopher C. Patterson et al. Worldwide estimates of incidence, prevalence and mortality of type 1 diabetes in children and adolescents: Results from the International Diabetes Federation Diabetes Atlas, 9th edition.

Epidemiologia Diabetes tipo 1



Tomado de: Christopher C. Patterson et al. Worldwide estimates of incidence, prevalence and mortality of type 1 diabetes in children and adolescents: Results from the International Diabetes Federation Diabetes Atlas, 9th edition.

Journal of the American Medical Informatics Association, 2024, **31(1)**, 165–173
https://doi.org/10.1093/jamia/ocad194
Advance access publication 9 October 2023
Research and Applications

Research and Applications

The role of health system penetration rate in estimating the prevalence of type 1 diabetes in children and adolescents using electronic health records

Piaopiao Li, MS[1,2], Tianchen Lyu, MS[3], Khalid Alkhuzam, MS[1], Eliot Spector, MS[3], William T. Donahoo, MD[4], Sarah Bost, MS[3], Yonghui Wu, PhD[3], William R. Hogan, MD[3], Mattia Prosperi, PhD[5], Desmond A. Schatz, MD[6], Mark A. Atkinson, PhD[7], Michael J. Haller, MD[6], Elizabeth A. Shenkman, PhD[3], Yi Guo, PhD[3], Jiang Bian, PhD[3], Hui Shao, PhD, MD*[,1,2,8,9]

[1]Department of Pharmaceutical Outcomes and Policy, College of Pharmacy, University of Florida, Gainesville, FL, United States, [2]Hubert Department of Global Health, Rollins School of Public Health, Emory University, Atlanta, GA, United States, [3]Department of Health Outcomes and Biomedical Informatics, College of Medicine, University of Florida, Gainesville, FL, United States, [4]Division of Endocrinology, Diabetes & Metabolism, College of Medicine, University of Florida, Gainesville, FL, United States, [5]Department of Epidemiology, College of Public Health and Health Professions, University of Florida, Gainesville, FL, United States, [6]Department of Pediatrics, College of Medicine, University of Florida, Gainesville, FL, United States, [7]Diabetes Institute, University of Florida, Gainesville, FL, United States, [8]Center for Drug Evaluation and Safety, University of Florida, Gainesville, FL, United States, [9]Department of Family and Preventive Medicine, School of Medicine, Emory University, Atlanta, GA, United States

*Corresponding author: Hui Shao, MD, PhD, Associate Professor, Hubert Department of Global Health, Emory Rollins School of Public Health, 1518 Clifton Road, NE, CNR Room 7041, Atlanta, GA 30322, USA (hui.shao@emory.edu)

Algoritmo para detectar diabetes en los registros electrónicos de salud

- HbA1c 6,5%
- Glucosa en ayunas mayor o igual a 126 mg/ dL,
- Glucosa plasmática aleatoria mayor o igual 200 mg/dL
- Tener un diagnóstico relacionado con la diabetes
- Tener un tratamiento para reducir la glucosa.

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Resultados

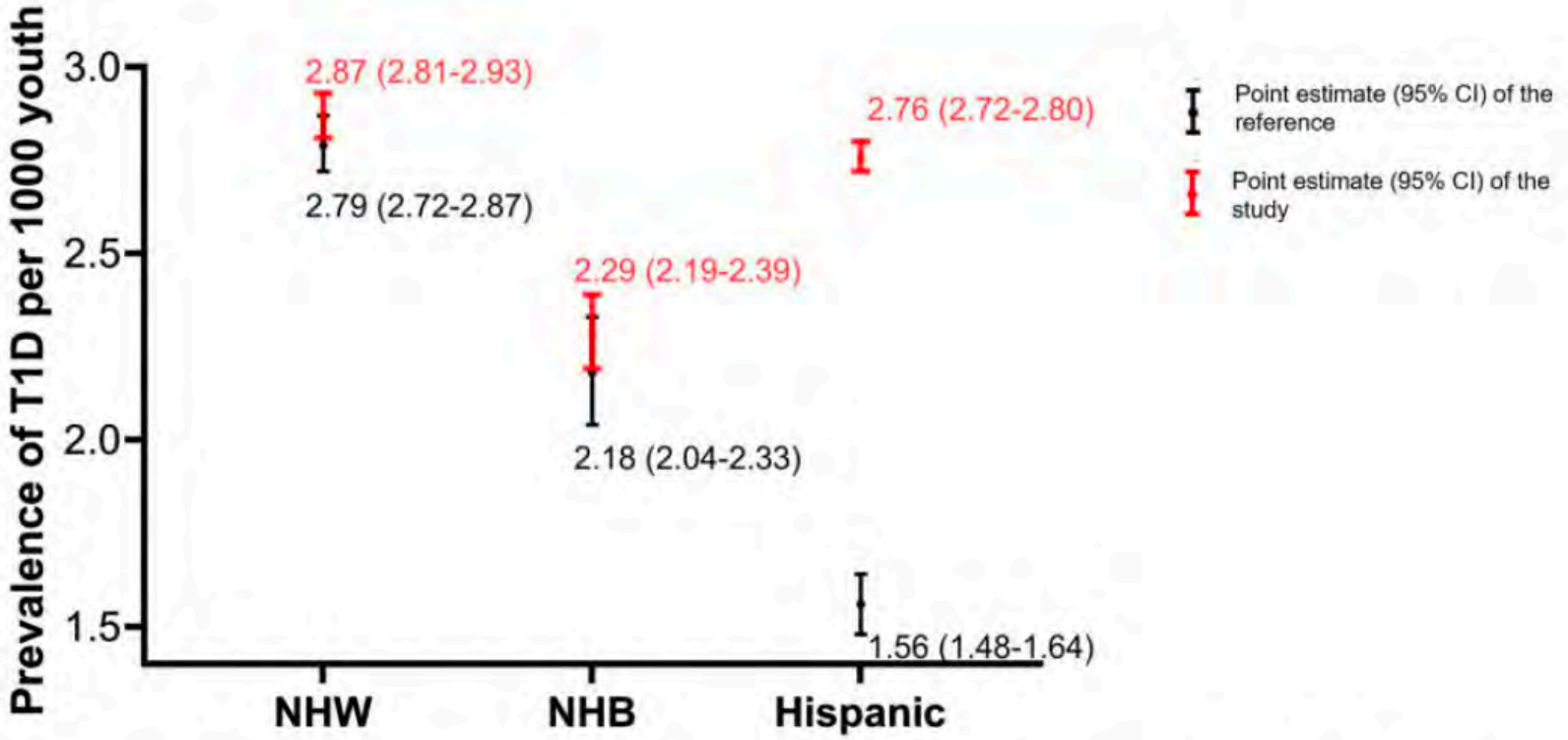

Figure 2. Comparison of the prevalence of type 1 diabetes between our study estimation and estimation from the SEARCH reference study. Abbreviations: NHW, non-Hispanic White; NHB, non-Hispanic Black; CI, confidence interval; SEARCH reference study, study conducted by SEARCH team (JAMA 2021;326(8):717-727. doi:10.1001/jama.2021.11165).

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Table 2. Estimation of type 1 diabetes prevalence in children and adolescents in Florida in 2019.

Race/ethnicity	Age group (years)	Sex						Age and sex standardized Prevalence of type 1 diabetes per 1000 youth
		Female			Male			
		T1D cases in eligible areas *N* (%)	Total population in eligible areas *N* (%)	Prevalence of type 1 diabetes per 1000 youth	T1D cases in eligible areas *N* (%)	Total population in eligible areas *N* (%)	Prevalence of type 1 diabetes per 1000 youth	
NHW	<5	12 (5)	24 710 (27)	0.49	6 (2)	25 065 (26)	0.24	
	5-9.9	41 (16)	22 755 (25)	1.80	44 (15)	24 313 (25)	1.81	
	10-14.9	98 (38)	22 779 (25)	4.30	91 (32)	23 528 (24)	3.87	
	15-17.9	60 (23)	13 456 (15)	4.46	83 (29)	15 157 (16)	5.48	3.08
	18-19.9	49 (19)	7754 (8)	6.32	62 (22)	8997 (9)	6.89	
NHB	<5	3 (1)	24 236 (25)	0.12	5 (2)	24 532 (24)	0.20	
	5-9.9	33 (14)	24 082 (25)	1.37	43 (20)	24 627 (25)	1.75	
	10-14.9	77 (33)	23 694 (24)	3.25	68 (31)	25 967 (26)	2.62	2.31
	15-17.9	68 (29)	14 607 (15)	4.66	60 (27)	14 524 (14)	4.13	
	18-19.9	53 (23)	10 952 (11)	4.84	44 (20)	10 639 (11)	4.14	
Hispanic	<5	18 (3)	59 816 (26)	0.30	19 (3)	62 628 (26)	0.30	
	5-9.9	107 (17)	54 801 (24)	1.95	96 (17)	56 004 (24)	1.71	
	10-14.9	229 (37)	55 990 (24)	4.09	233 (37)	59 963 (24)	3.89	2.79
	15-17.9	142 (23)	34 723 (15)	4.09	184 (23)	36 186 (15)	5.08	
	18-19.9	121 (20)	23 806 (10)	5.08	142 (20)	23 956 (10)	5.93	
	<5	33 (3)	108 762 (26)	0.30	30 (3)	112 225 (26)	0.27	
Whole	5-9.9	181 (16)	101 638 (24)	1.78	183 (16)	104 944 (24)	1.74	
population	10-14.9	404 (33)	102 463 (25)	3.94	392 (33)	109 458 (25)	3.58	
	15-17.9	270 (28)	62 786 (15)	4.30	327 (28)	65 867 (15)	4.96	2.81
	18-19.9	223 (21)	42 512 (10)	5.25	248 (21)	43 592 (10)	5.69	

Abbreviations: T1D, type 1 diabetes; NHW, non-Hispanic White; NHB, non-Hispanic Black; eligible areas, ZIP Code Tabulation Areas with an observed health system penetration rate above the minimum threshold.

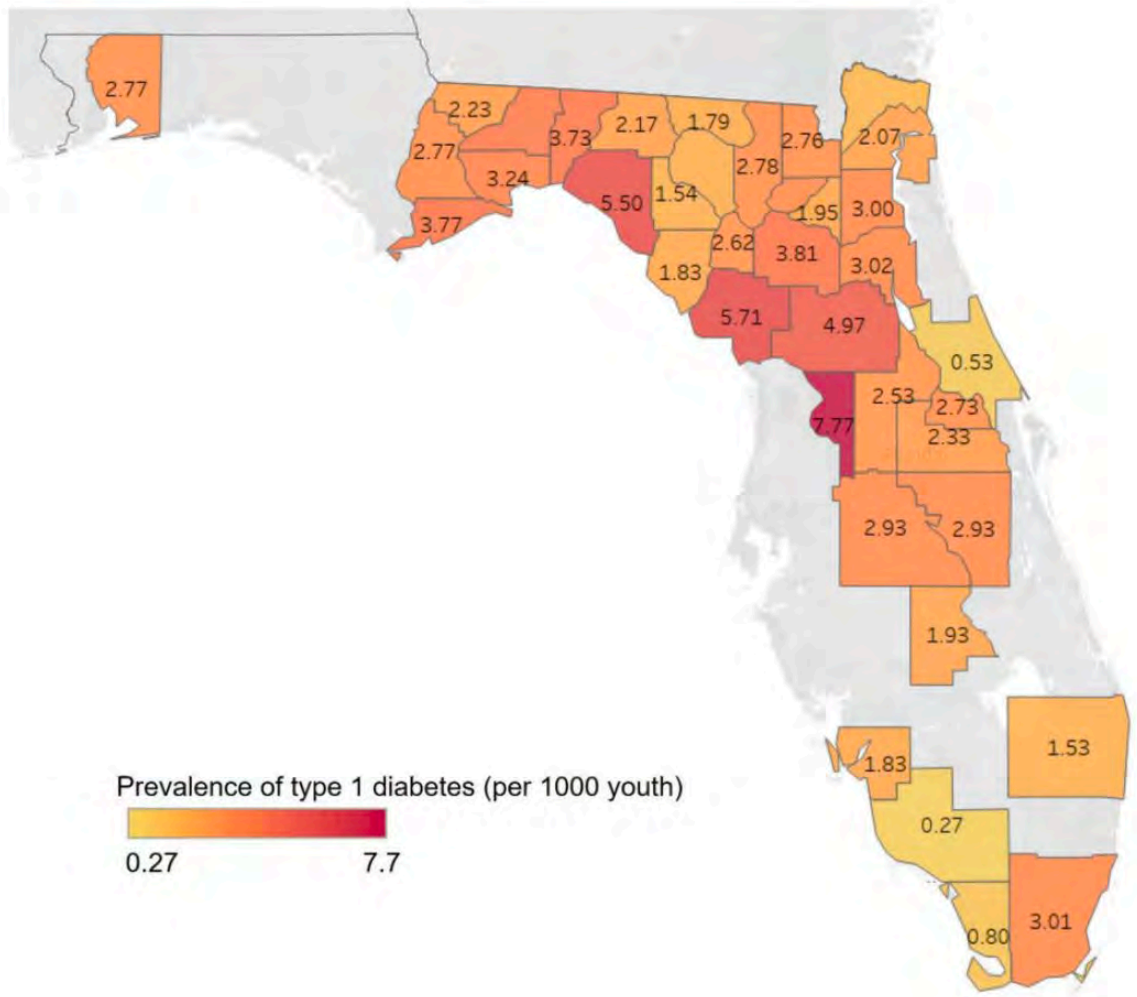

Figure 3. Geographical heatmap for the prevalence of type 1 diabetes in Florida in 2019.

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DOI: 10.1111/dme.15069

DIABETIC Medicine

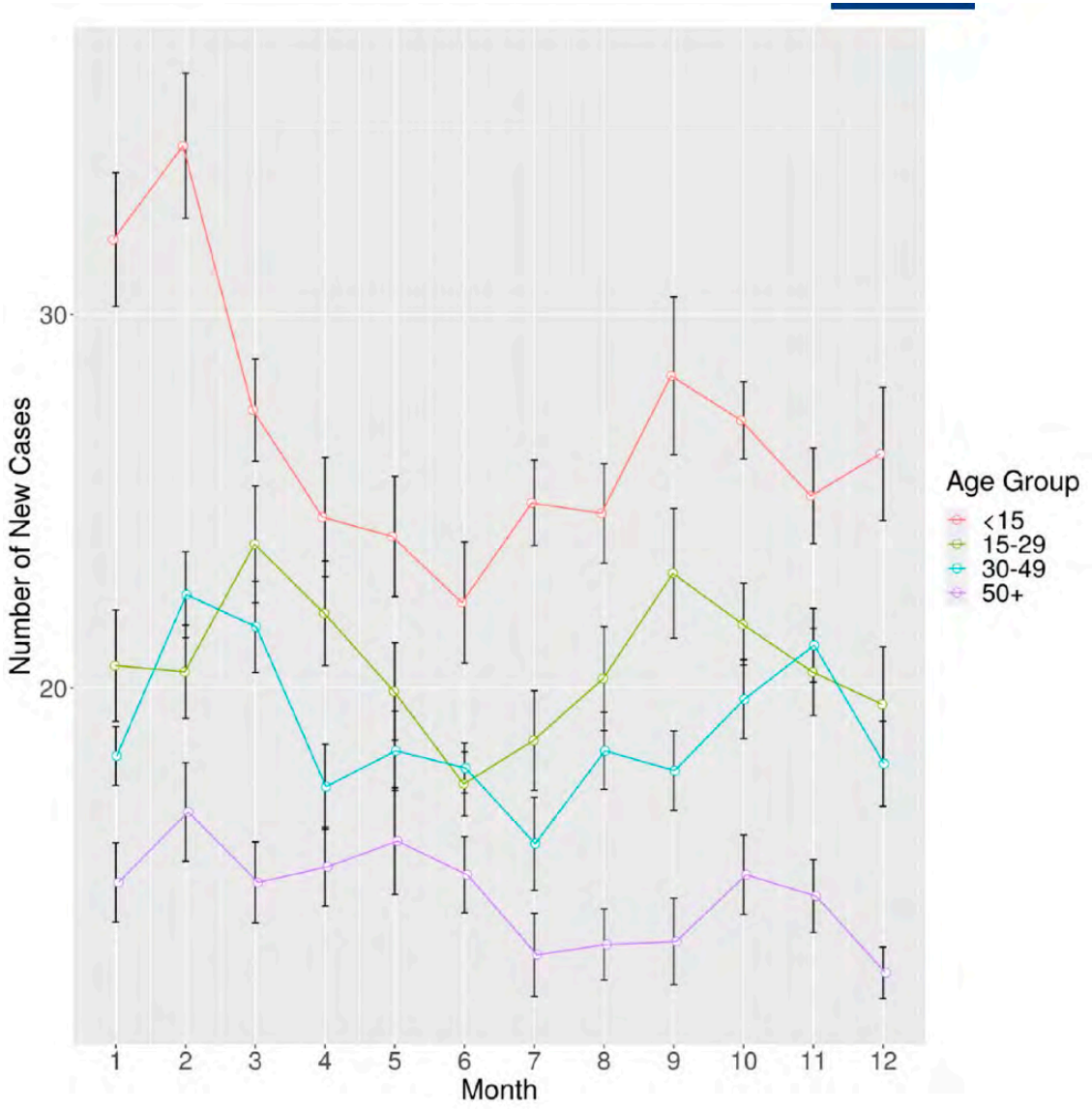
RESEARCH: EPIDEMIOLOGY

Type 1 diabetes incidence in Scotland between 2006 and 2019

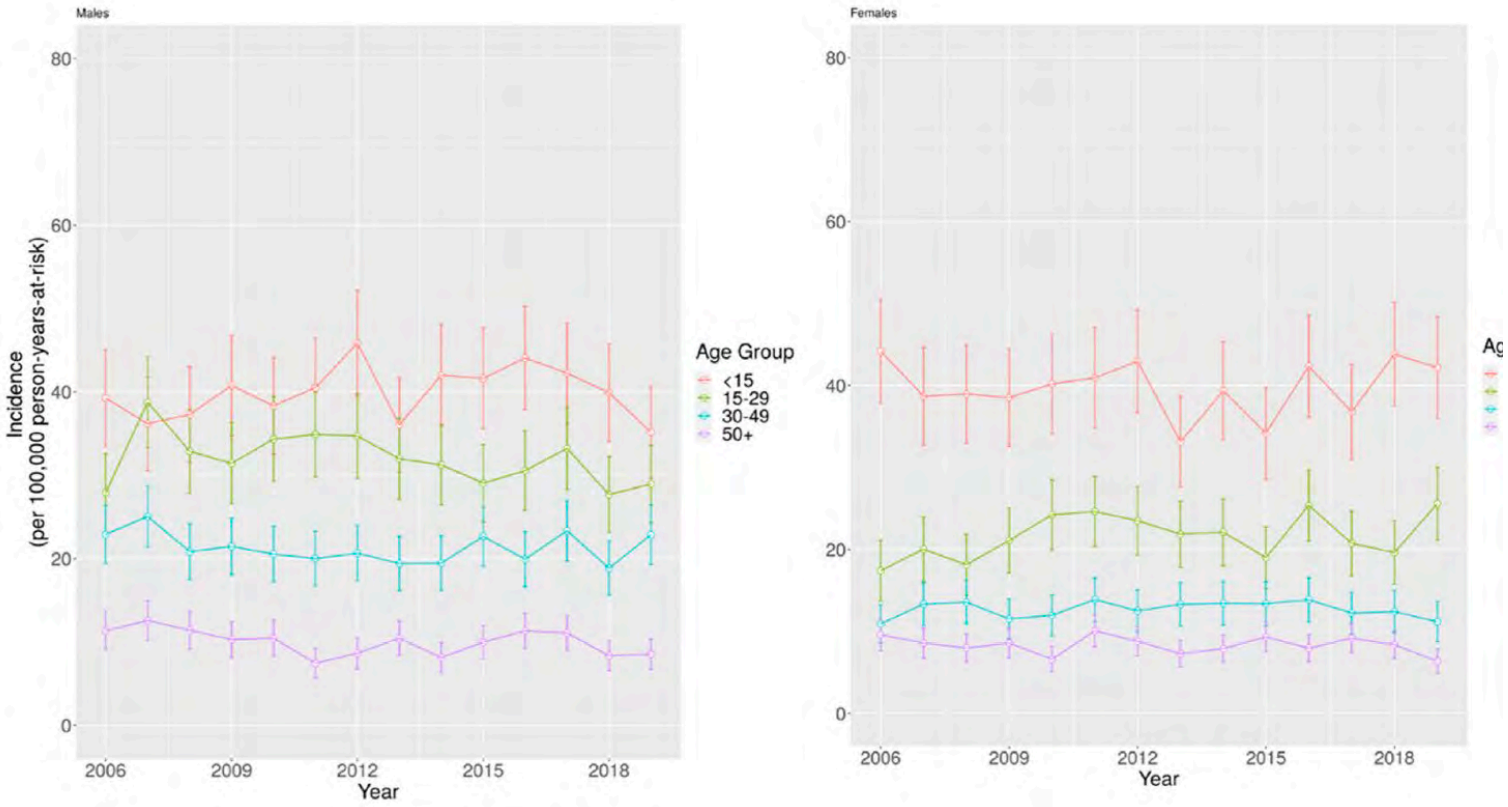
India Thomson[1] | Niall Anderson[2] | Louise Bath[3] | Sarah Kiff[3] | Chris Patterson[4] | Sam Philip[5] | Norman Waugh[6] | Sarah H. Wild[2] | on behalf of the Scottish Study Group for the Care of Diabetes in the Young and the Scottish Diabetes Research Network Epidemiology Group

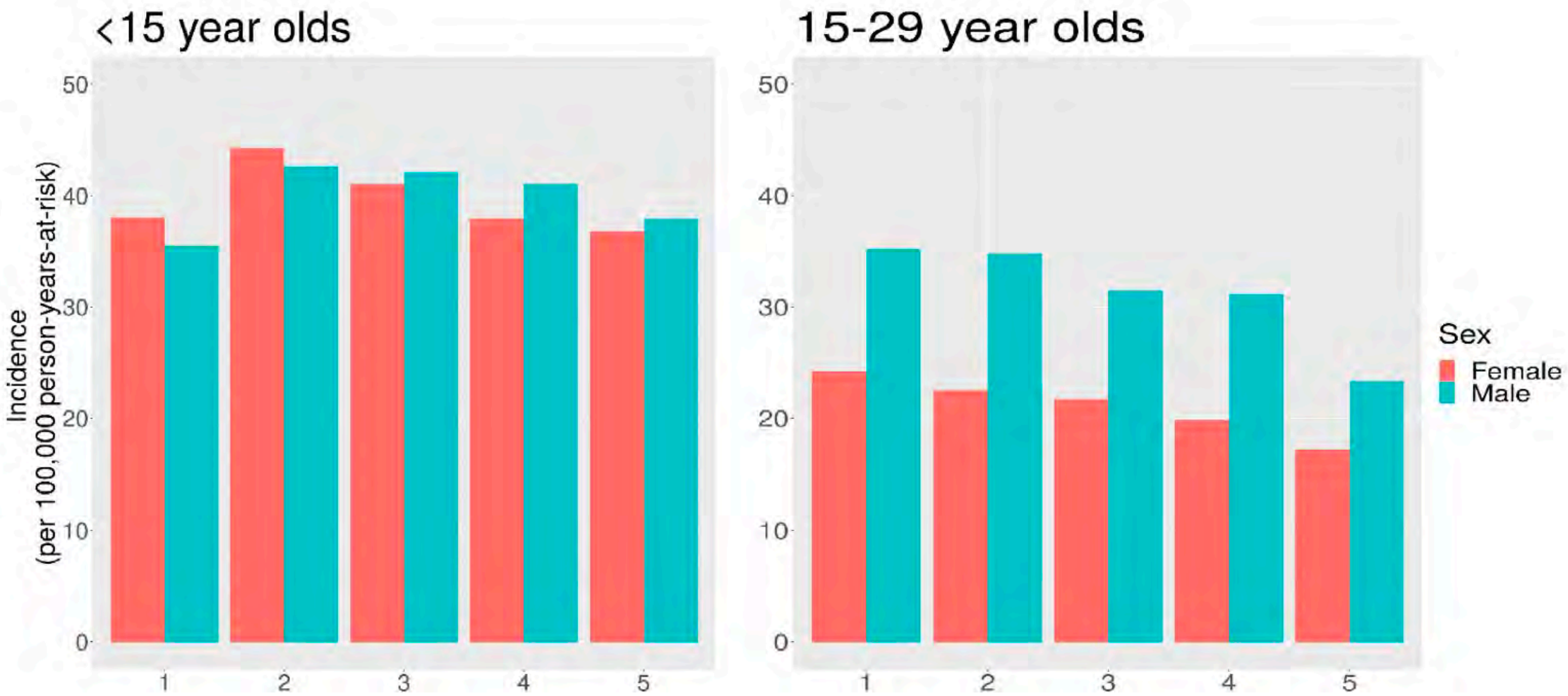
Thomson I. Diabetic Medicine. 2023;40:e15069. https://doi.org/10.1111/dme.15069

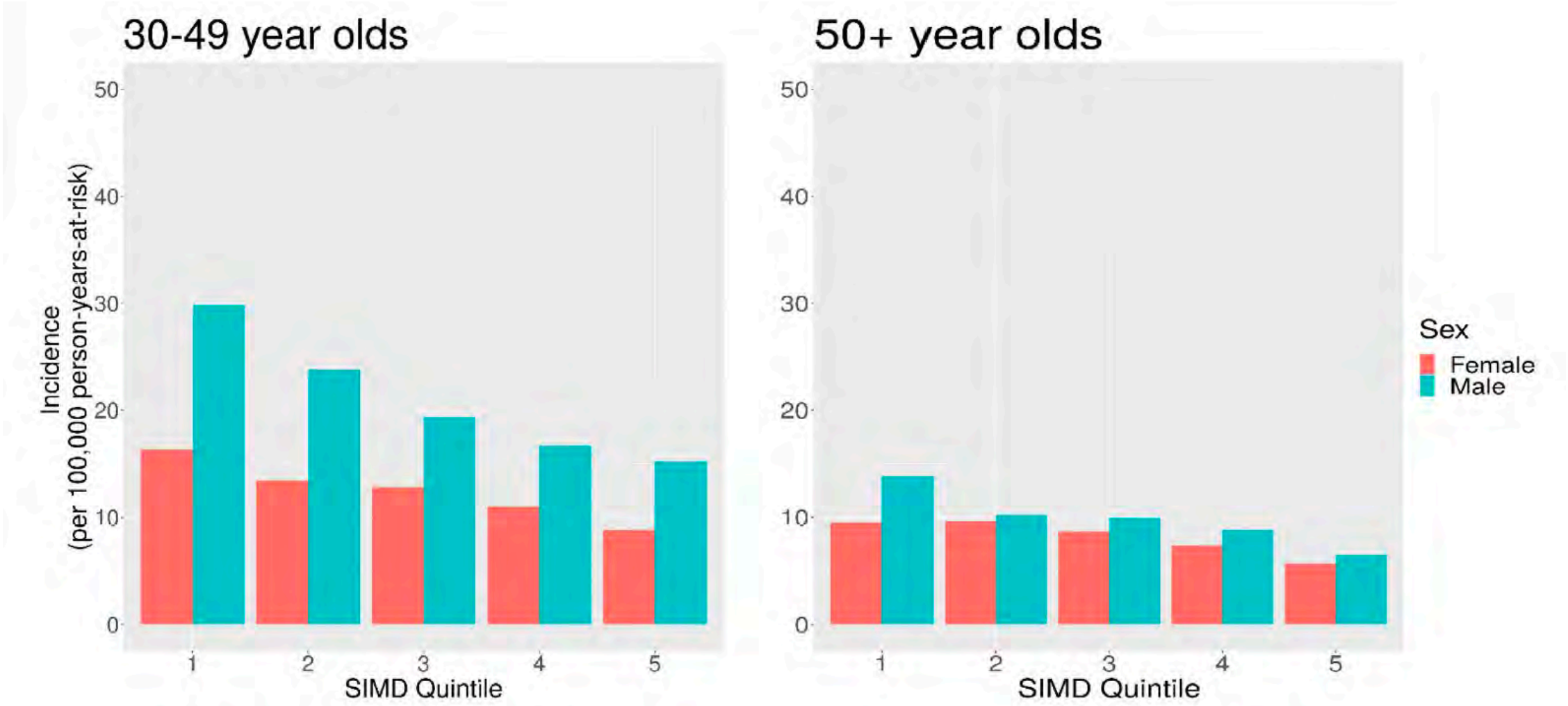
Casos incidentes en Escocia 2006-2019



Inicidencia annual en Escocia 2006 -2019



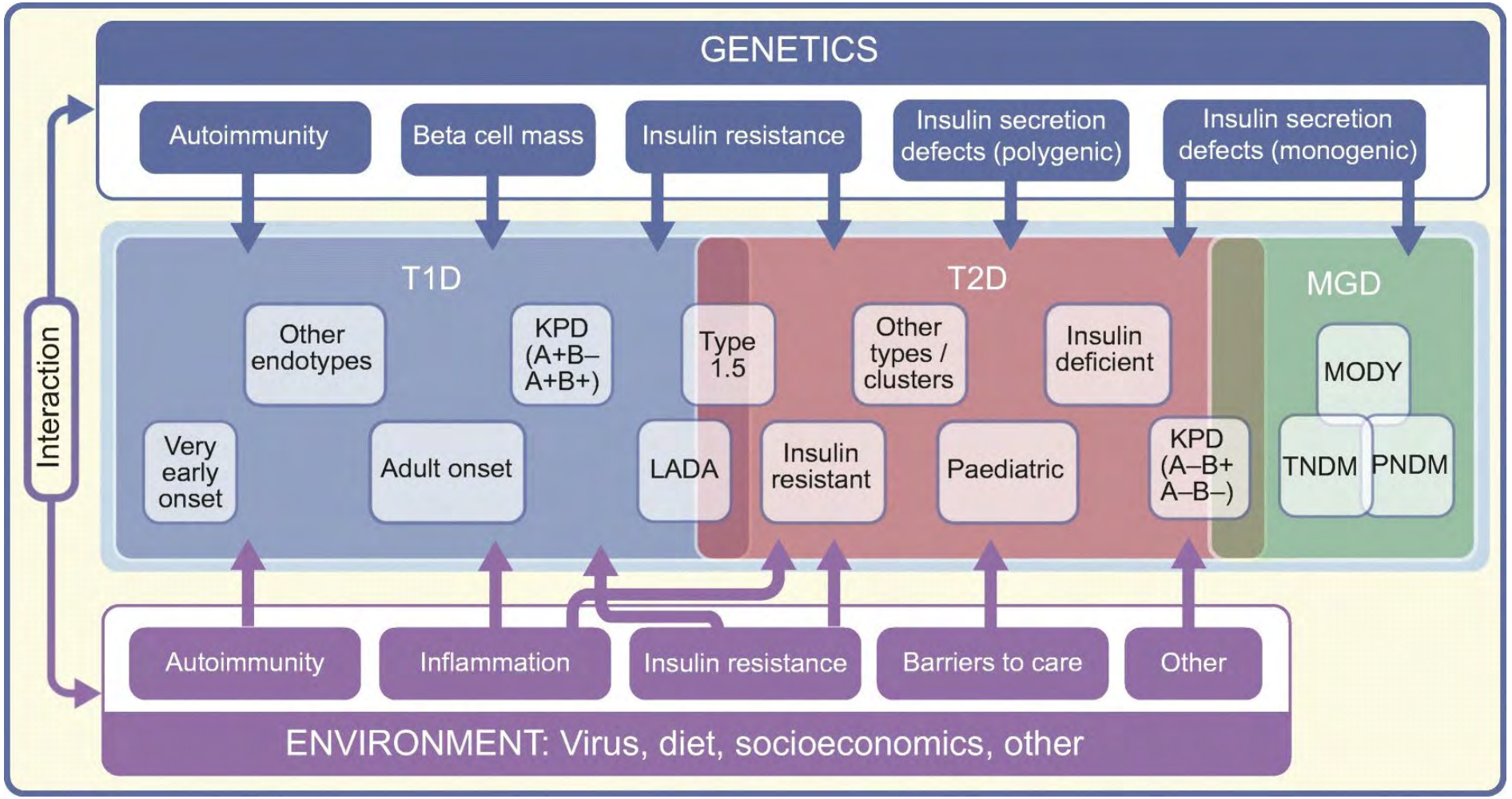

<15 year olds
15-29 year olds
Incidence
(per 100,000 person-years-at-risk)
50
40
30
20
10
0
1
2
3
4
5
Sex
Female
Male


30-49 year olds
50+ year olds
Incidence
(per 100,000 person-years-at-risk)
0
10
20
30
40
50
1
2
3
4
5
SIMD Quintile
Sex
Female
Male

- Estudios transversales repetidos cada año + registro de base poblacional que contiene data primaria y secundaria

Generalidades

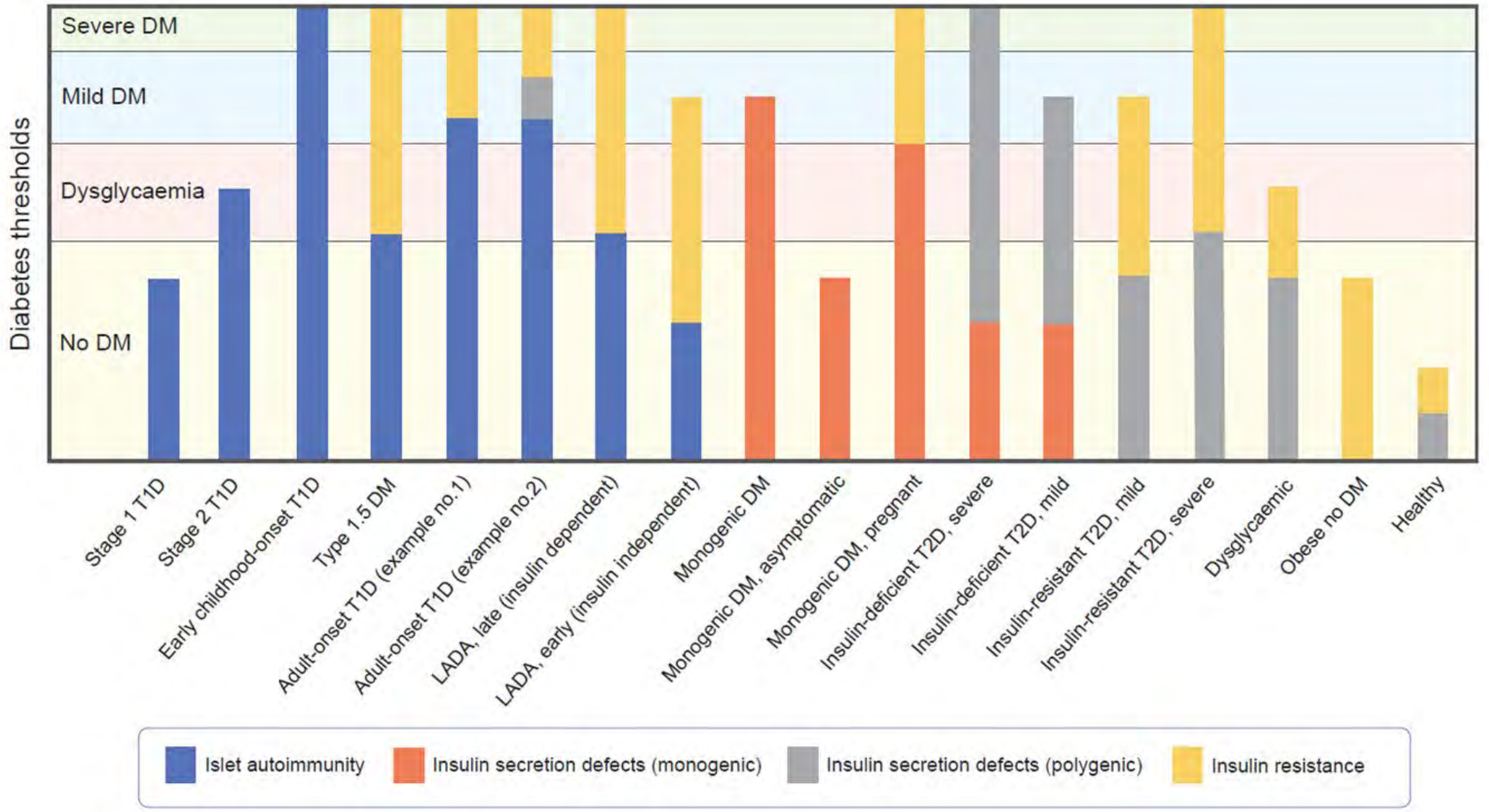
Heterogeneity within and between types of diabetes



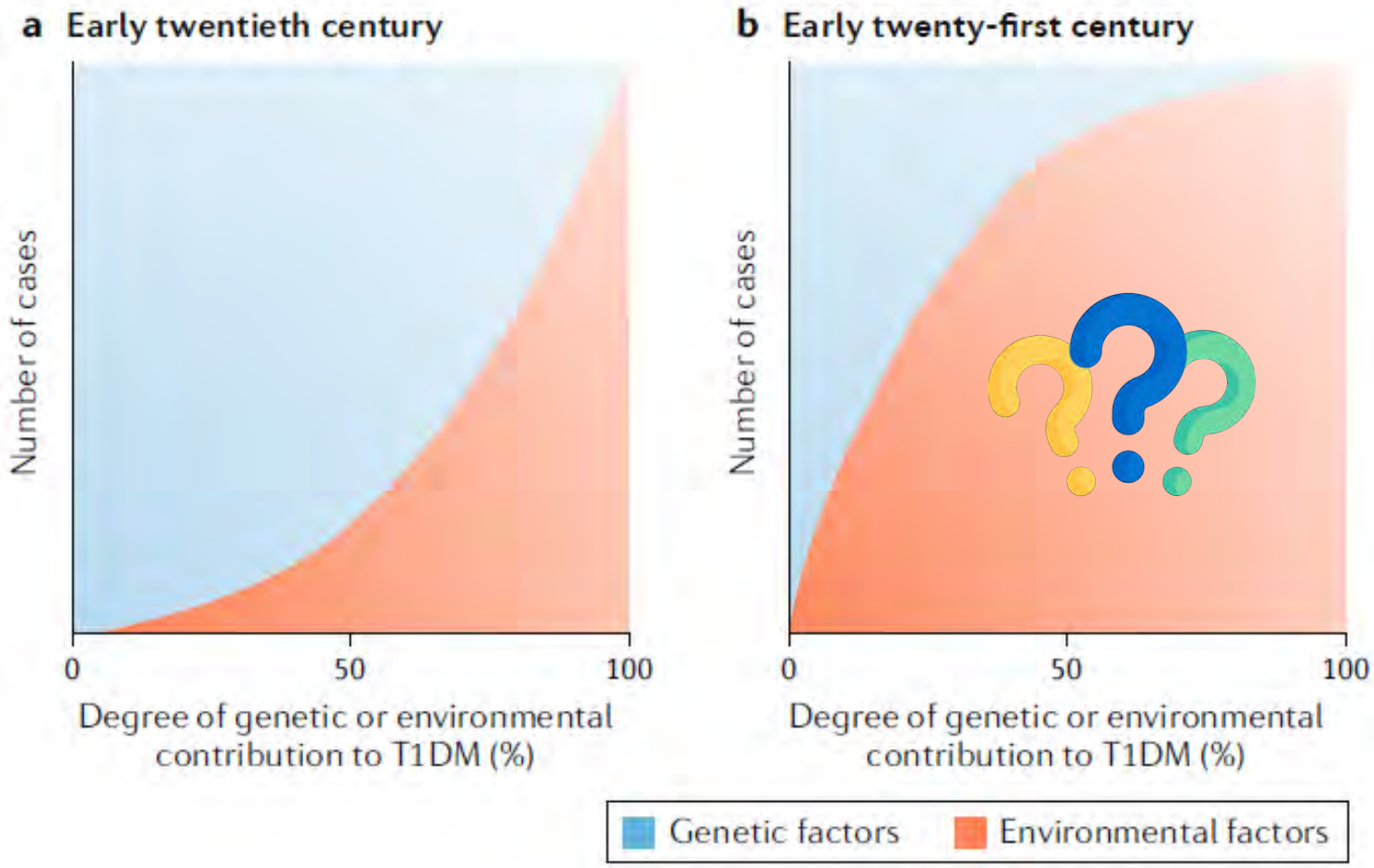
Tomado de: Redondo et al. The clinical consequences of heterogeneity within and between different diabetes types. Diabetologia volume 63, pages2040–2048 (2020)

Generalidades

Heterogeneity within and between types of diabetes



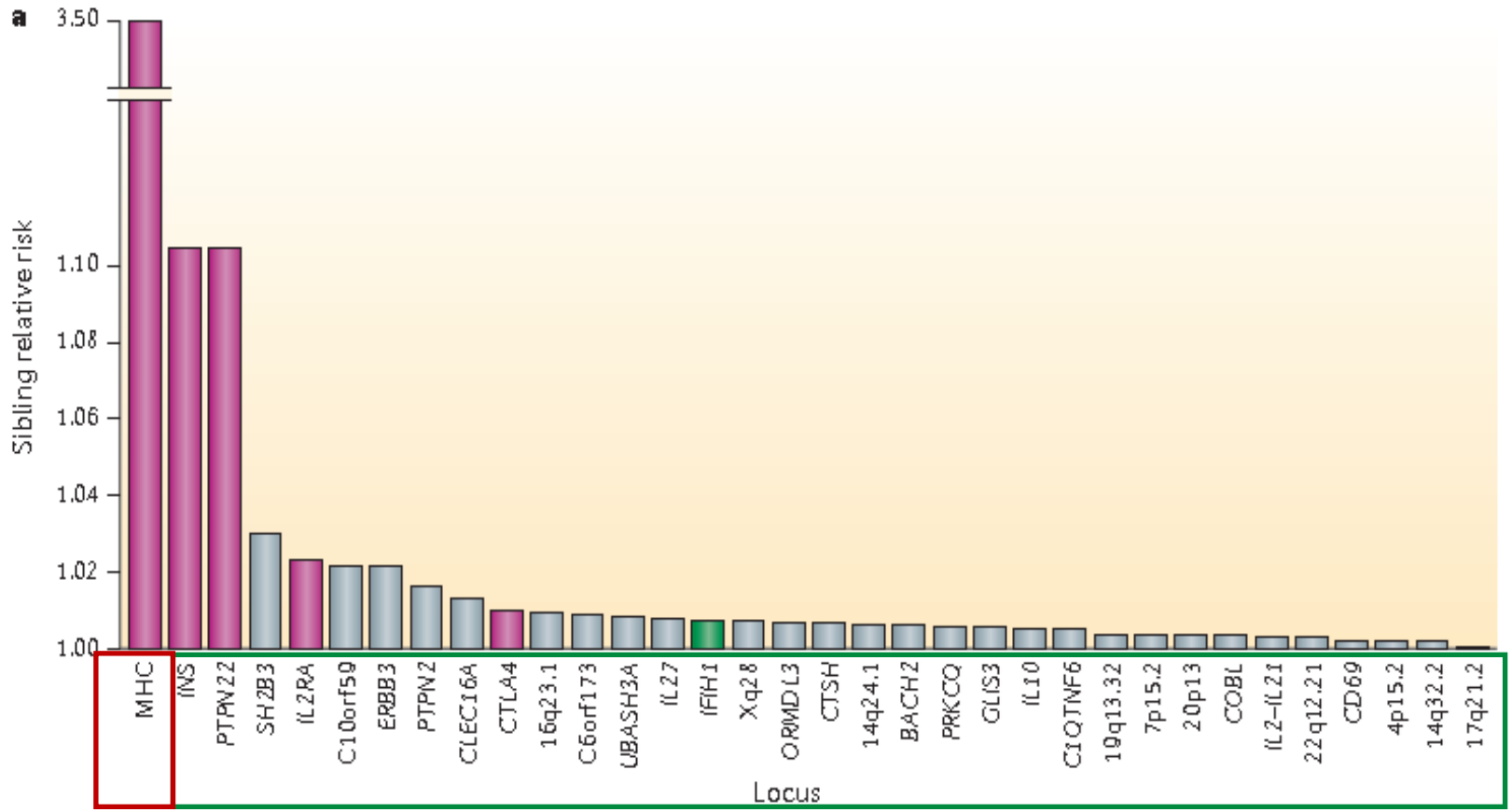
Redondo et al. The clinical consequences of heterogeneity within and between different diabetes types. Diabetologia volume 63, pages2040–2048 (2020)



Tomado de: *Katsarou, A., Gudbjörnsdottir, S., Rawshani, A. et al. Type 1 diabetes mellitus. Nat Rev Dis Primers 3, 17016 (2017). https://doi.org/10.1038/nrdp.2017.16*

Genetics of T1D

Genome-wide association studies (GWAs) have shown that more than 50 genes increase susceptibility to T1D



Genes HLA

Genes no-HLA

Polychronakos & Li, Nat Rev Genet 2011;12:781e92, Barrett JC et al, Nat Genet. 2009;41:703–7

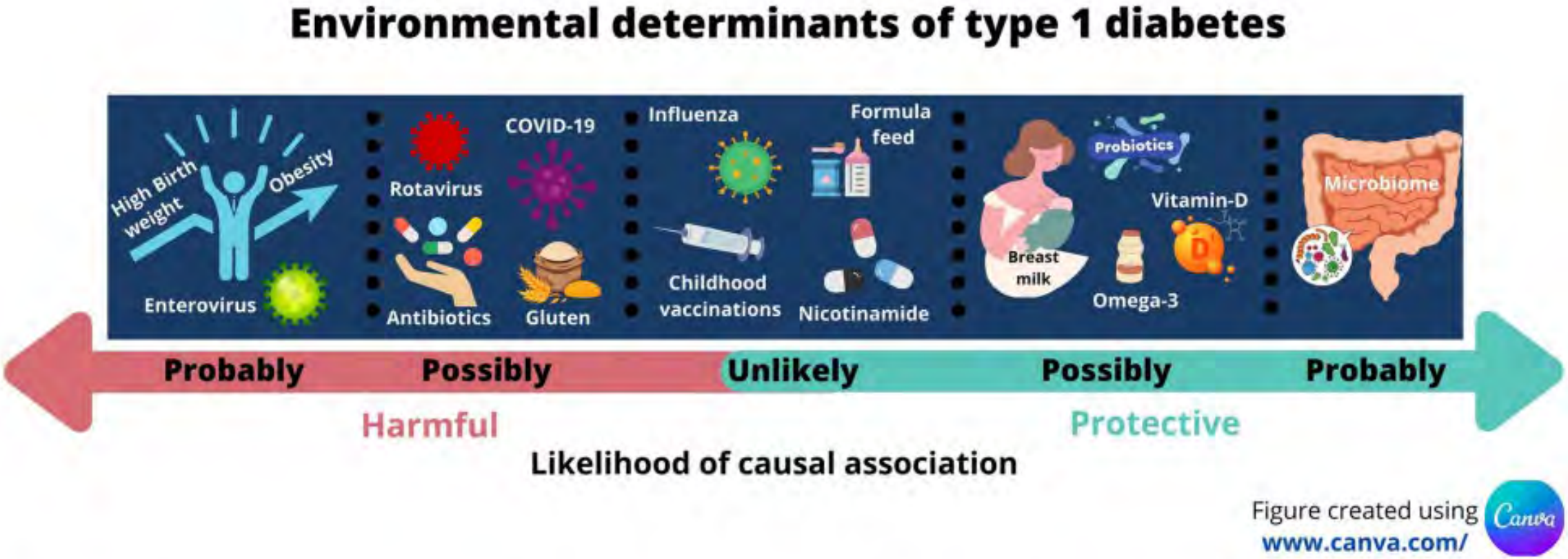
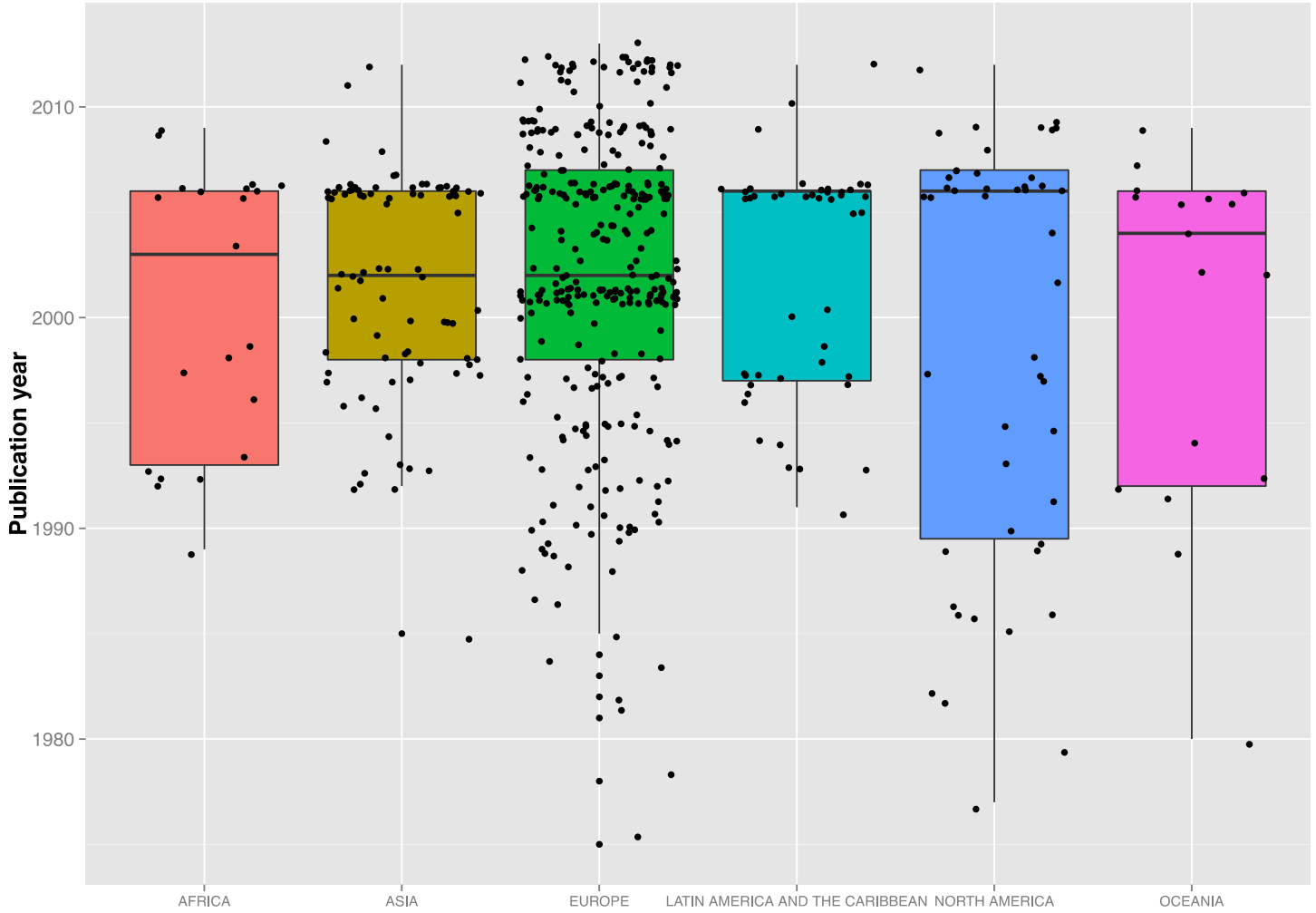


FIGURE 1 | Infographic illustrating the key environmental determinants of type 1 diabetes and their likelihood of contributing to causality.

Tomado de: *Quinn LM, Wong FS, Narendran P. Environmental Determinants of Type 1 Diabetes: From Association to Proving Causality. Front Immunol. 2021;12(October):1–15.*

Publicaciones sobre Diabetes Tipo 1 entre 1980-2015



Algunos factores ambientales relacionados con diabetes tipo 1

PLOS ONE

Final model

Adjusted R^2 = 55%, 10-fold cross-validation R^2 = 41%

Go to Tableau Public

Table 1. Final Stepwise MLR model.

Code	Coefficients	Estimate	Std. Error	*p* Value
	(Intercept)	-25.240	15.390	0.106
CE_18	UV radiation (J/mt2, 2004)	-0.002	0.001	0.055
DD_21	Fertility rate, total (births per woman)	2.181	1.309	0.100
ED_41	Mobile cellular subscriptions (per 100 people)	0.066	0.027	0.018
EH_45	Health expenditure per capita (constant 2005 intern. $)	0.001	0.001	0.019
HI_59	Hepatitis B (HepB3) immunization coverage [(a)]	-0.085	0.027	0.002
HR_47	Mean BMI (kg/m2) Male >20 years of age [(b)]	1.263	0.611	0.042

The model included all significant predictors found in the analyses by domain.

(a) Among 1-year-olds (%)

(b) age-standardized estimate.

doi:10.1371/journal.pone.0118298.t001

Se requiere "Nuevos análisis para identificar más factores geográficos, conductuales, sociales y económicos, o indicadores que apunten a factores causales latentes de la diabetes tipo 1".

Paula Andrea Diaz-Valencia et al. Covariation of the Incidence of Type 1 Diabetes with Country Characteristics Available in Public Databases. PLoS One. 2015; 10(2): e0118298.

Diaz-Valencia *et al. BMC Public Health* (2015) 15:255
DOI 10.1186/s12889-015-1591-y

RESEARCH ARTICLE Open Access

Global epidemiology of type 1 diabetes in young adults and adults: a systematic review

Paula A Diaz-Valencia[1,2*], Pierre Bougnères[1,3] and Alain-Jacques Valleron[1,2]

Abstract

Background: Although type 1 diabetes (T1D) can affect patients of all ages, most epidemiological studies of T1D focus on disease forms with clinical diagnosis during childhood and adolescence. Clinically, adult T1D is difficult to discriminate from certain forms of Type 2 Diabetes (T2D) and from Latent Autoimmune Diabetes in Adults (LADA). We searched the information available worldwide on the incidence of T1D among individuals over 15 years of age, and which diagnostic criteria should be used use to qualify T1D in adults. We then studied the variation of T1D incidence with age in adults, and compared it to the incidence in the <15 years-old.

Methods: A systematic review of the literature was performed to retrieve original papers in English, French and Spanish published up to November 6, 2014, reporting the incidence of T1D among individuals aged over 15 years. The study was carried out according to the PRISMA recommendations.

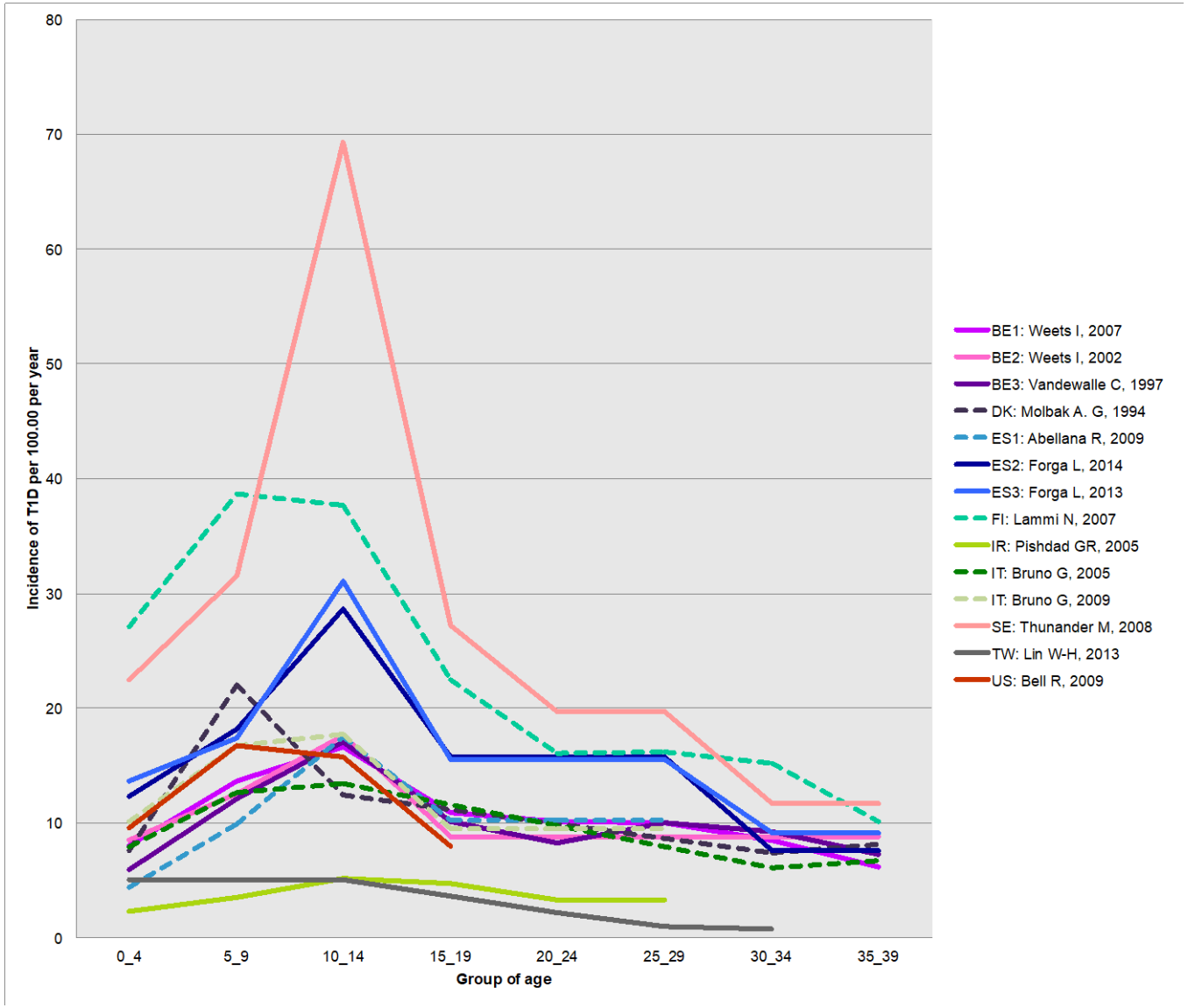
Results: We retrieved information reporting incidence of T1D among individuals aged more than 15 years in 35 countries, and published in 70 articles between 1982 and 2014. Specific anti-beta-cell proteins or C-peptide detection were performed in 14 of 70 articles (20%). The most frequent diagnostic criteria used were clinical symptoms and immediate insulin therapy. Country-to-country variations of incidence in those aged >15 years paralleled those of children in all age groups. T1D incidence was larger in males than in females in 44 of the 54 (81%) studies reporting incidence by sex in people >15 years of age. The overall mean male-to-female ratio in the review was 1.47 (95% CI = 1.33-1.60, SD = 0.49, n = 54, p = <0.0001). Overall, T1D incidence decreased in adulthood, after the age of 14 years.

Conclusions: Few studies on epidemiology of T1D in adults are available worldwide, as compared to those reporting on children with T1D. The geographical variations of T1D incidence in adults parallel those reported in children. As opposed to what is known in children, the incidence is generally larger in males than in females. There is an unmet need to evaluate the incidence of autoimmune T1D in adults, using specific autoantibody detection, and to better analyze epidemiological specificities – if any – of adult T1D.

PROSPERO registration number: CRD42012002369.

Keywords: Type 1 diabetes, Systematic review, Adults, Incidence, Epidemiology

Incidencia de diabetes tipo 1de inicio en la edad adulta



Tendencias de DT1 en adultos

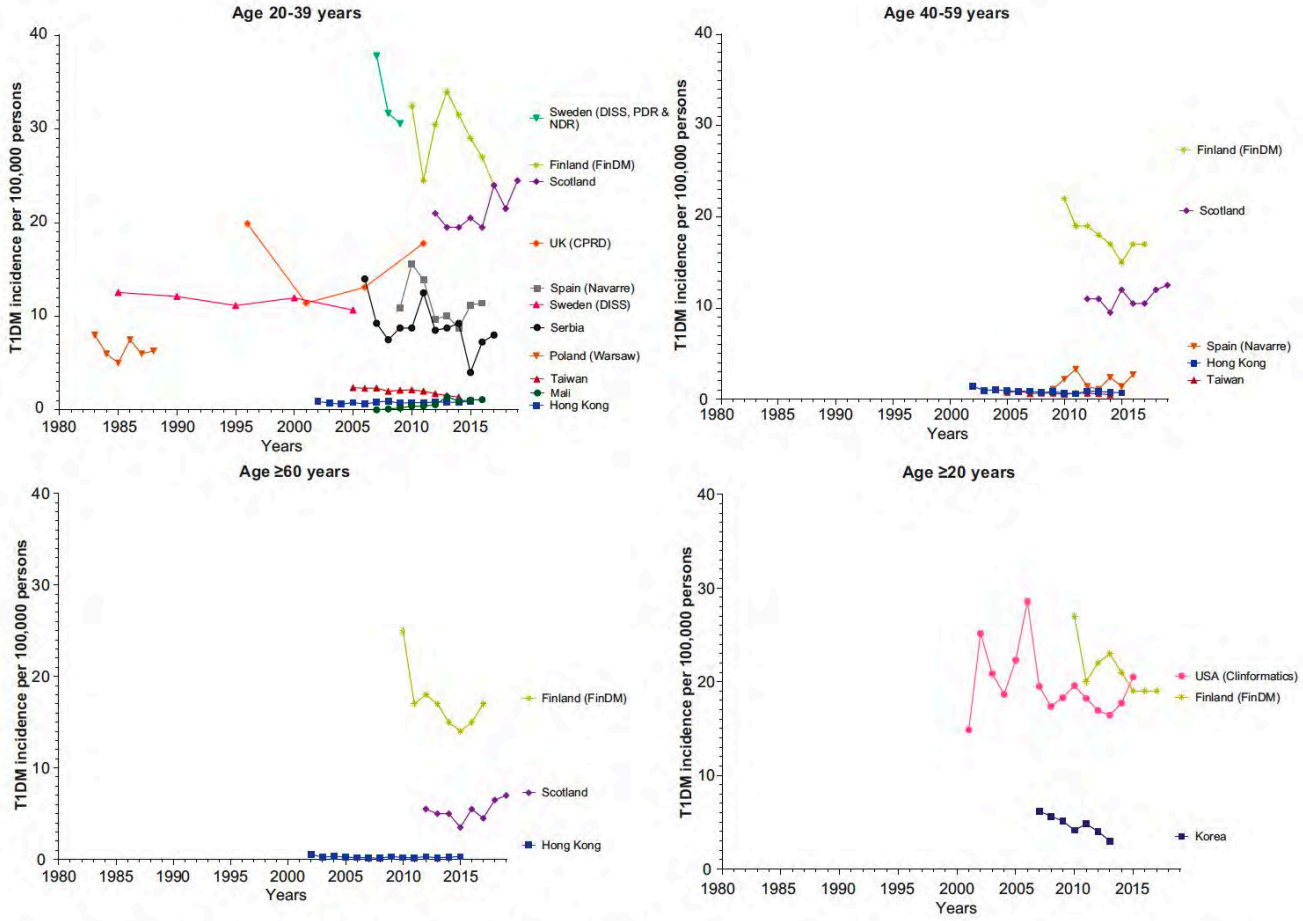
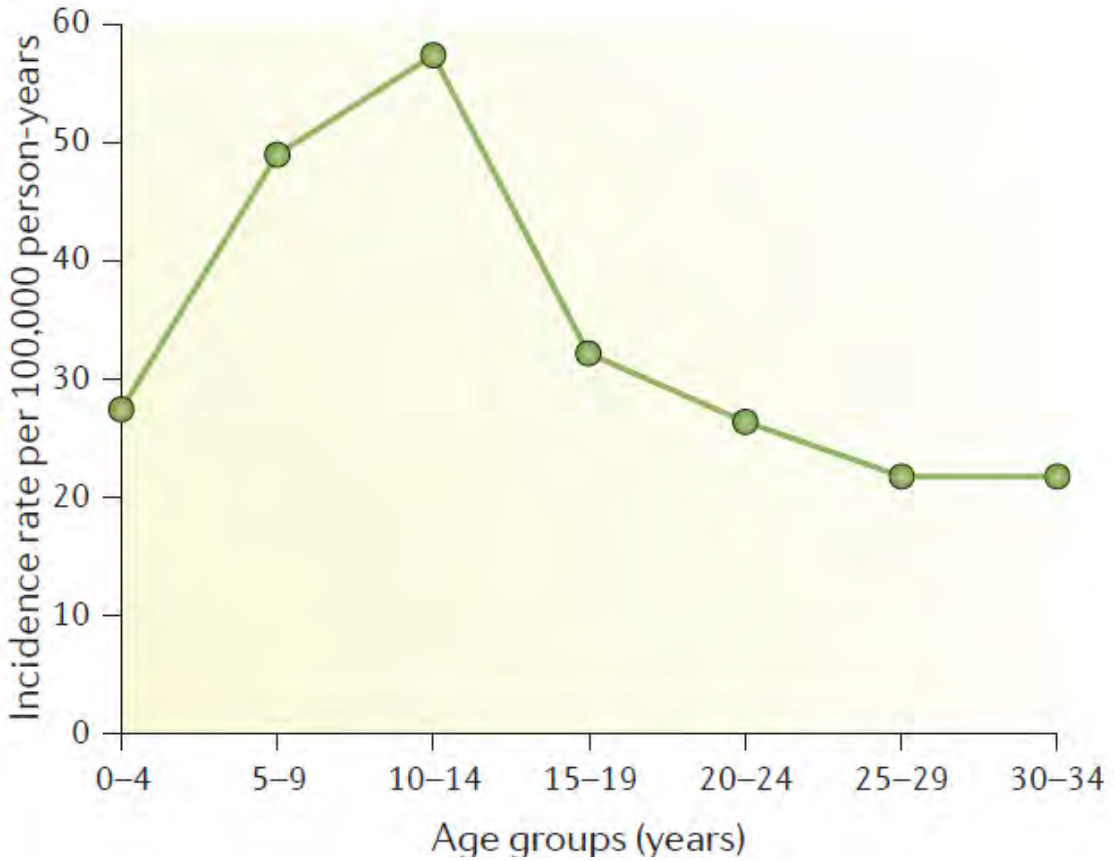


Figure 3—Trends in the incidence of adult-onset T1D by age-group and country/region. Note: U.S. trend data are based on an insurance population. As such, it cannot be determined whether declines in adult-onset T1D are true changes over time or due to changes in the underlying study population. Clinformatics, Clinformatics Data Mart database.

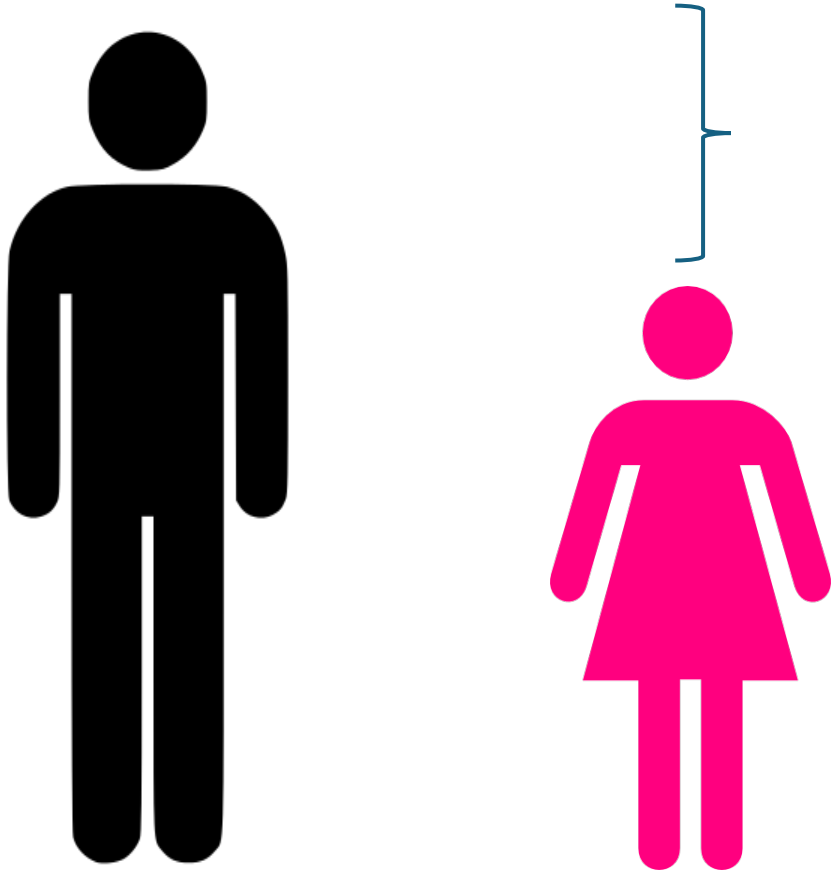
Harding J. Incidence of Adult-Onset T1D From 32 Regions Diabetes Care Volume 45, April 2022

Tomado de: Katsarou et al. Type 1 diabetes mellitus. NATURE REVIEWS

Presentación de la Diabetes de Tipo 1 según la edad



Se han encontrado diferencias en la presentación de diabetes de tipo 1 por sexo



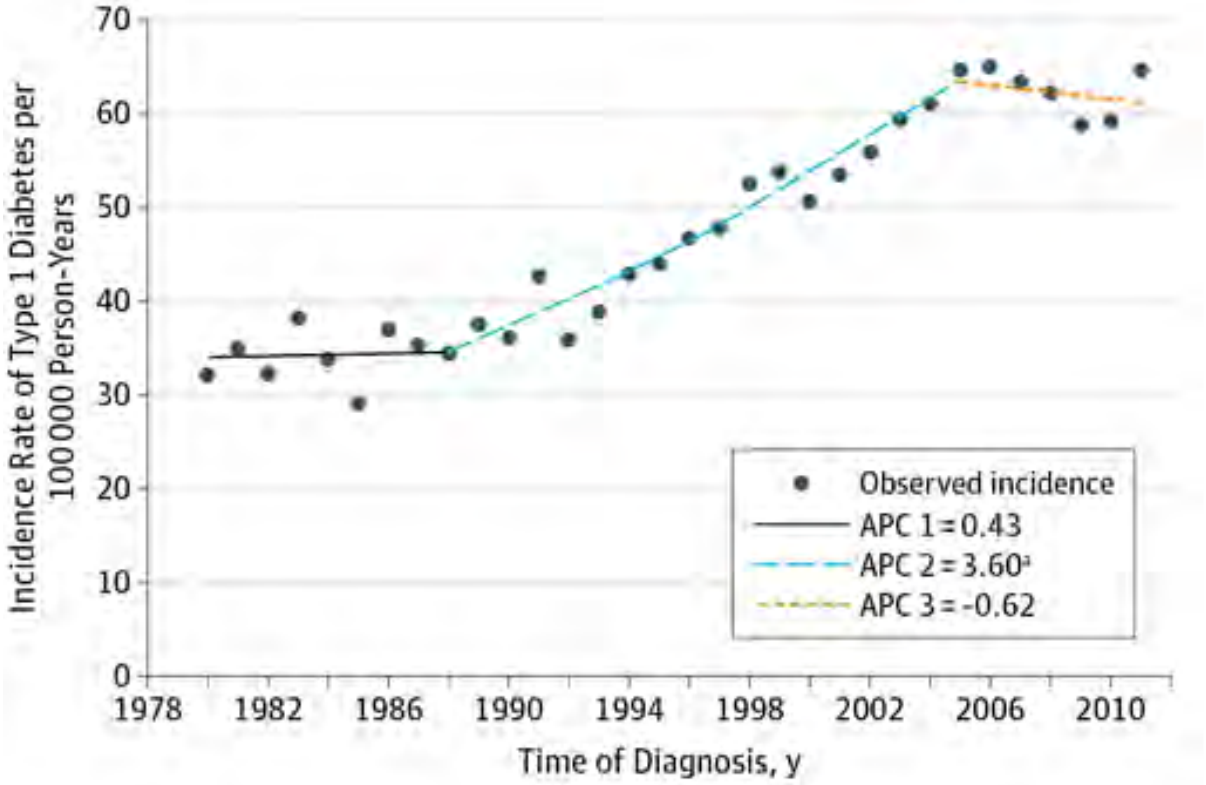
47%

Exceso de riesgo en hombres

Overall mean male-to-female ratio: 1.47 (95% CI = 1.33-1.66, SD = 0.49). Tesis doctoral Paula Diaz.

Diabetes de Tipo 1 en Finlandia

Based on a retrospective cohort study of children ≤ 14 years diagnosed with type 1 diabetes in Finland in 2006-2011



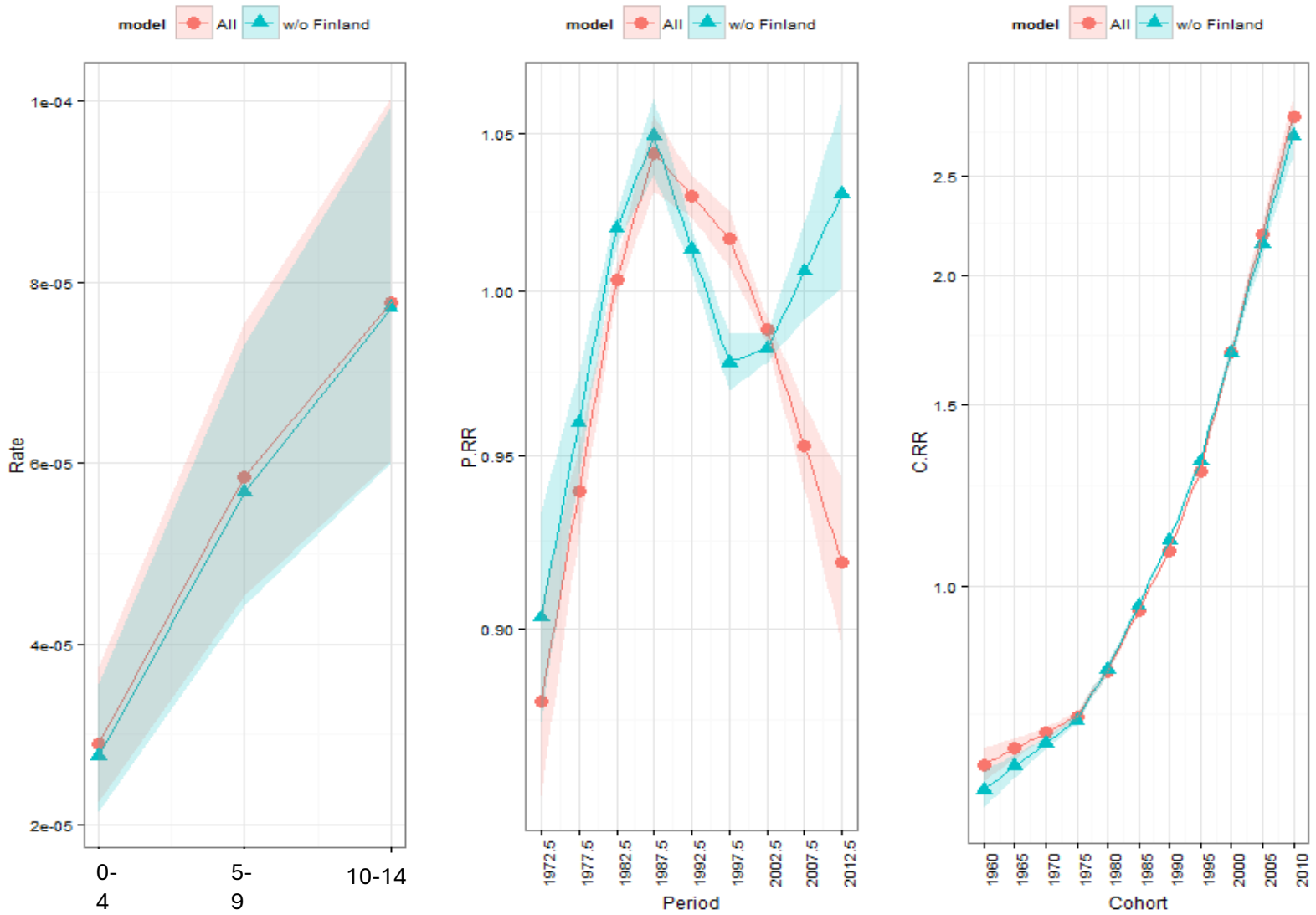
APC = Average annual percentage change

Table. Age- and Sex-Specific Incidence Rates of Type 1 Diabetes in Finland Between 2006 and 2011

Age Group, y	Incidence Rate of Type 1 Diabetes in Finland per 100 000 Person-Years (95% CI)		
	Boys	Girls	Total
0-4			
2006	57.1 (45.5-70.7)	57.5 (45.6-71.4)	57.3 (48.9-66.7)
2007	65.1 (52.8-79.5)	51.2 (40.1-64.3)	58.3 (49.9-67.7)
2008	68.3 (55.7-82.8)	56.9 (45.2-70.6)	62.7 (54.0-72.4)
2009	44.0 (34.1-55.9)	45.9 (35.6-58.3)	44.9 (37.7-53.2)
2010	60.3 (48.7-73.9)	48.2 (37.6-60.8)	54.4 (46.4-63.4)
2011	64.6 (52.5-78.5)	40.5 (30.9-52.1)	52.8 (44.9-61.7)
5-9			
2006	87.4 (72.9-103.8)	73.5 (60.0-89.0)	80.6 (70.5-91.6)
2007	81.9 (67.9-98.0)	74.4 (60.8-90.1)	78.3 (68.3-89.2)
2008	64.8 (52.4-79.2)	65.7 (52.9-80.5)	65.2 (56.2-75.2)
2009	72.6 (59.5-87.7)	66.9 (54.1-81.9)	69.8 (60.5-80.2)
2010	62.2 (50.2-76.3)	61.5 (49.2-75.8)	61.9 (53.1-71.6)
2011	80.8 (67.1-96.6)	64.9 (52.3-79.5)	73.0 (63.6-83.5)
10-14			
2006	65.4 (53.6-79.0)	50.4 (40.0-62.7)	58.1 (50.1-67.0)
2007	62.6 (51.0-76.1)	46.3 (36.2-58.3)	54.6 (46.8-63.4)
2008	68.5 (56.2-82.7)	49.4 (38.9-62.0)	59.2 (50.9-68.4)
2009	80.4 (66.9-95.8)	43.2 (33.3-55.2)	62.2 (53.6-71.7)
2010	69.3 (56.7-83.9)	53.7 (42.5-67.1)	61.7 (53.1-71.3)
2011	83.6 (69.6-99.6)	53.0 (41.8-66.4)	68.6 (59.5-78.8)
Total (0-14)			
2006	69.4 (62.0-77.4)	60.3 (53.3-68.0)	64.9 (59.7-70.3)
2007	69.7 (62.2-77.7)	57.0 (50.2-64.6)	63.5 (58.4-68.9)
2008	67.2 (59.9-75.2)	57.3 (50.5-64.9)	62.4 (57.3-67.8)
2009	64.7 (58.4-73.6)	51.7 (45.2-59.0)	58.3 (53.3-63.4)
2010	63.8 (56.8-71.7)	54.2 (47.7-61.8)	59.1 (52.0-62.1)
2011	75.8 (68.4-84.6)	52.2 (46.1-59.9)	64.3 (59.5-70.2)

Tomado de: Harjutsalo V et al. Incidence of Type 1 Diabetes in Finland. JAMA. 2013; 310 (4): 427–428.

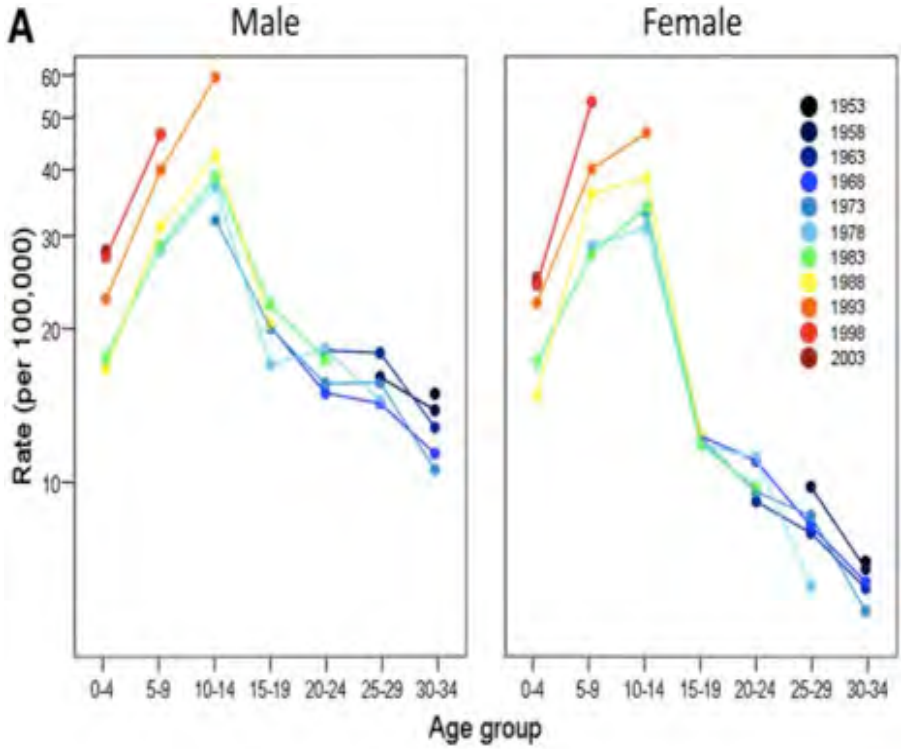
Modelos Edad Período Cohorte (APC) en Diabetes de tipo 1



w/o: without, RR: relative risk

Diferencias regionales según modelo APC para Diabetes tipo 1

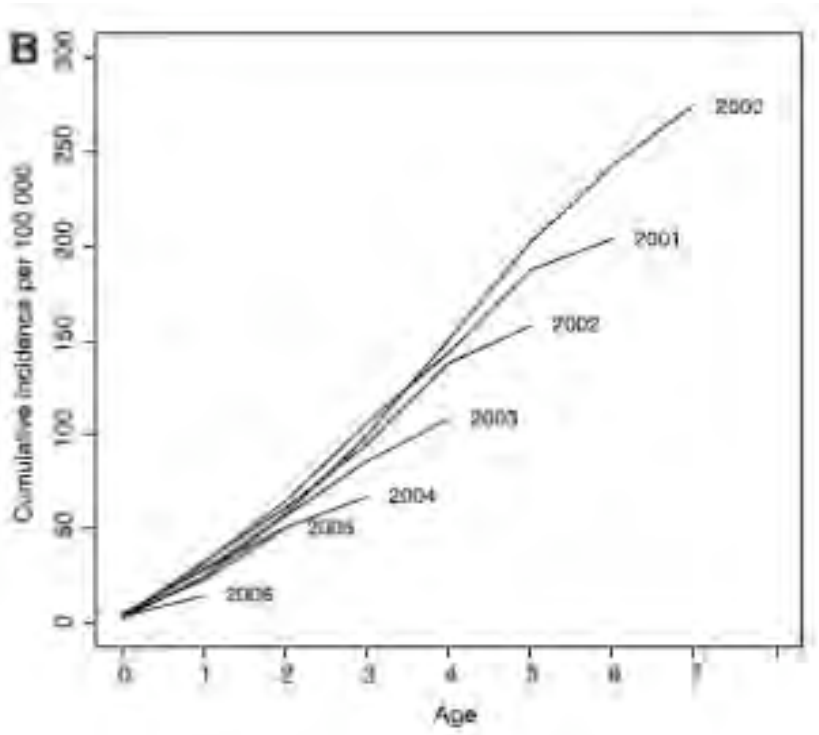
Finland



Observed incidence rates by 5-year birth cohort for male and female subjects.

Dahlquist GG, et al. *Diabetes Care*. *2011*; 34:1754-1759.

Sweden



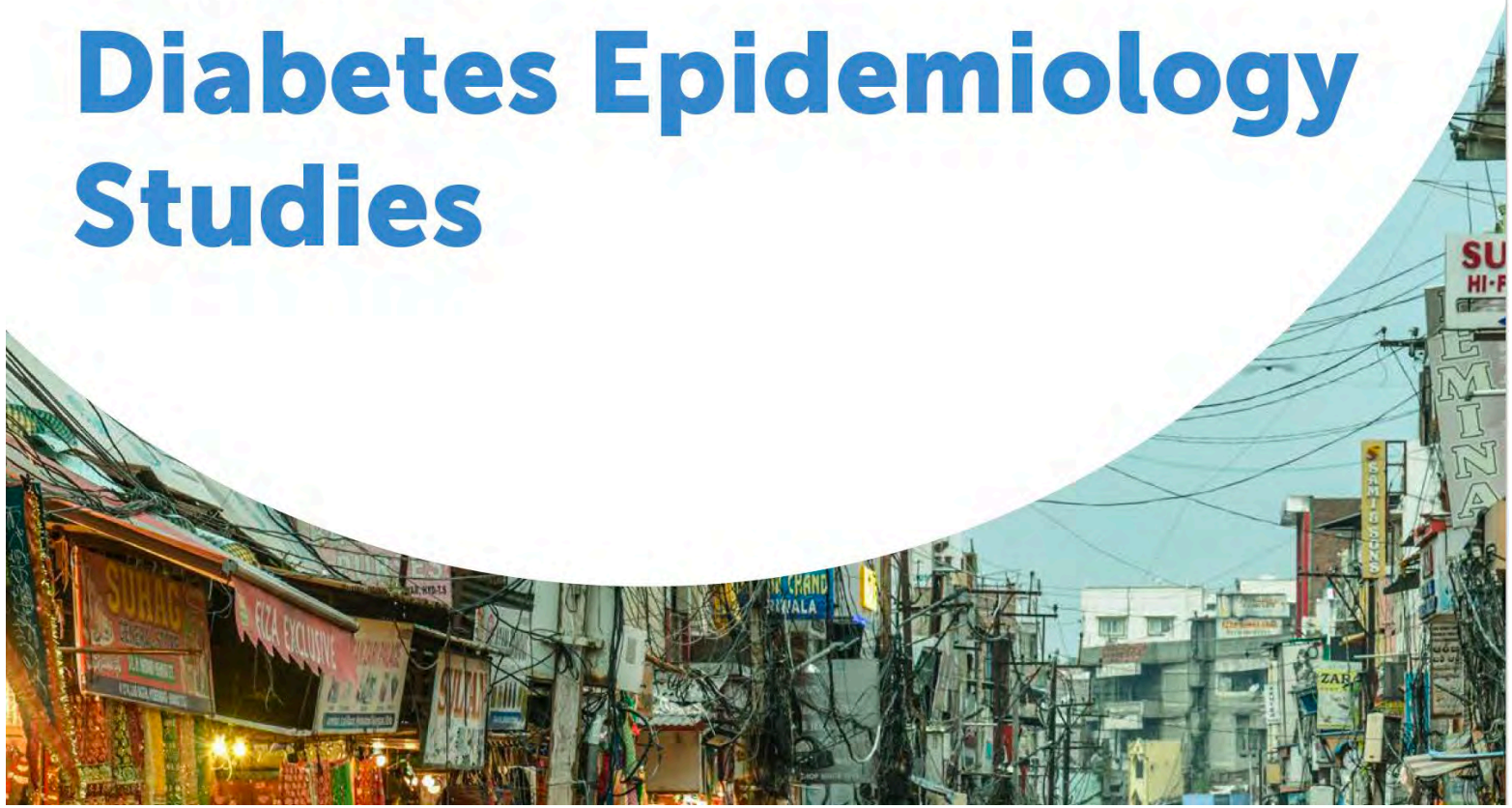
Cumulative incidence of childhood T1D for yearly birth cohorts 2000-2006.

Berhan Y, Et al. *Diabetes*. *2011*; 60:577-581.

Recomendación para realizar **estudios epidemiológicos en diabetes** por expertos de la Federación Internacional de la Diabetes

International Diabetes Federation

IDF guide for Diabetes Epidemiology Studies



: *International Diabetes Federation. IDF Diabetes Atlas, 9th edn. Brussels, Belgium [Internet]. Atlas de la Diabetes de la FID. 2019. 1–169 p.*

Principles of conducting prevalence studies

Key points

- When designing a prevalence study, the pros and cons of different options for choosing the target population and the sample must be considered
- The sample size for a prevalence study depends on the expected prevalence and the desired precision
- Different diagnostic tests for diabetes may produce different prevalence values

Organisation and conduct of the survey

Key points

- The study design must take into account the biological, social and cultural determinants of the disease, along with their interactions
- The methodology should be carefully planned to capture the relevant details in a simple questionnaire
- A dynamic leader supported by a trained multidisciplinary team should organise the screening procedures

Data handling and statistical analysis

Key points

- A good analysis begins at the planning stage of a study. The analysis plan must include the elements that are necessary to extrapolate findings to the wider population of interest
- Missing data can compromise the study results. Limited options exist for dealing with missing data at the point of analysis
- Presentation of the study results must be clear and consistent

Incidence

Key point

- Incidence measures the rate at which new cases of diabetes develop in a defined period of time. It is the most direct measure of the risk for diabetes in the population

Mortality, survival and life expectancy in people with diabetes

Key points

- Mortality, survival and life expectancy provide useful measures of health at a population level
- The completeness and accuracy of the recording of deaths and their causes vary considerably among health systems
- Analyses based solely on mentions of diabetes on death certificates underestimate the influence of diabetes on mortality
- Mortality of people with diabetes is higher than mortality of people without diabetes, and relative risks differ within populations depending on factors including type of diabetes, age and sex

Diabetes registries and their role in diabetes epidemiology

Key points

- A diabetes registry is a systematic collection or collation of data for a population
- A registry can be used for a variety of purposes, including supporting direct clinical care, for clinical audit, to inform policy and for research
- A key challenge relating to registries is the considerable resources that are required to set them up and maintain high-quality data

A plan to improve global type 1 diabetes epidemiology data

The discovery and subsequent introduction of insulin therapy in 1922 led to fundamental changes in the treatment and epidemiology of type 1 diabetes. In Boston, MA, USA, the life expectancy of people with type 1 diabetes diagnosed at age 10 years increased from 2·6 years during 1914–1922 to 45 years during 1939–1945.[1] Therefore, type 1 diabetes is not only a condition of young people.[3,4] Reduced life expectancy of people with type 1 diabetes compared with the general population still persists at a global

and Ward and colleagues[6] and other global estimates (appendix),[3,7,9] they all highlight the scarcity of data on incidence and mortality for type 1 diabetes, especially in people older than 19 years. We therefore propose a plan to increase knowledge of type 1 diabetes epidemiology to improve services and outcomes. This plan includes actions at global and national levels.

At a global level, mapping data gaps in existing estimates as well as targeted studies to address these gaps are needed. Re-launching global studies, such as the WHO Diabetes Mondiale study and the EURODIAB register, broadening their scope beyond incidence studies in childhood and adolescence, and

These targets include "100% of people with type 1 diabetes having access to affordable insulin and blood glucose self-monitoring". An improved understanding of type 1 diabetes epidemiology is essential in achieving this goal.

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*David Beran, Kurt Højlund, Stéphane Besançon, Mads Loftager Mundt, Graham D Ogle, Kaushik Ramaiya, Tom Robinson, Jannet Svensson, Jaakko Tuomilehto, Sarah Wild, Anders Green

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Lancet Diabetes Endocrinol 2023

Published Online February 1, 2023 https://doi.org/10.1016/S2213-8587(23)00029-3

Colaboración Diamond 2

Noviembre 2023, Ginebra - Suiza

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- Epidemiology group teacher
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- AMNET Network: Americas Network for Chronic Disease Surveillance

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- Associate Professor, Translational Medicine
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- AMNET Network: Americas Network for Chronic Disease Surveillance

Grupo de estudio de Diabetes

UNIVERSIDAD DE ANTIOQUIA

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GESIS researcher
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Cindy Caterine Sánchez Monroy
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MSc Research Biology
Mathematical modeling

Carlos Andrés Pérez Aguirre
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Oscar Ignacio Mendoza Cardozo
Research epidemiologist
Mathematical modeling

Grupo de estudio de Diabetes

UNIVERSIDAD DE ANTIOQUIA

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http://redamnet.org/

Questions?

Muchas gracias por su atención!!

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Seminarios en línea sobre diabetes

22 de Mayo 2024

Registro Nacional de pacientes con diabetes tipo 1.

RENACED-DT1

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Directora, Clínica EnDi
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Steno Diabetes Center Aarhus

midt regionmidtjylland

REGISTRO NACIONAL DE DIABETES TIPO 1
RENACED-DT1

Dra. Raquel Noemí Faradji Hazán
Directora RENACED- DT1

Agenda

- Introducción Diabetes Tipo 1 (DT1)
- Registros de DT1 a nivel mundial
- RENACED-DT1
  - Profesional
  - Personal
- Áreas de oportunidad y reflexiones finales

Introducción

- La diabetes tipo 1 (DT1) es una condición causada por daño autoinmune de las células beta productoras de insulina en los islotes del páncreas ocasionando deficiencia de insulina
- Representa 5 a 10% de todos los casos de diabetes
- Su incidencia tiene un pico en la pubertad y adultez temprana, pero puede presentarse en todos los grupos de edad
- Las personas con DT1 viven durante muchas décadas después del inicio de la enfermedad por lo que la prevalencia es mayor en adultos

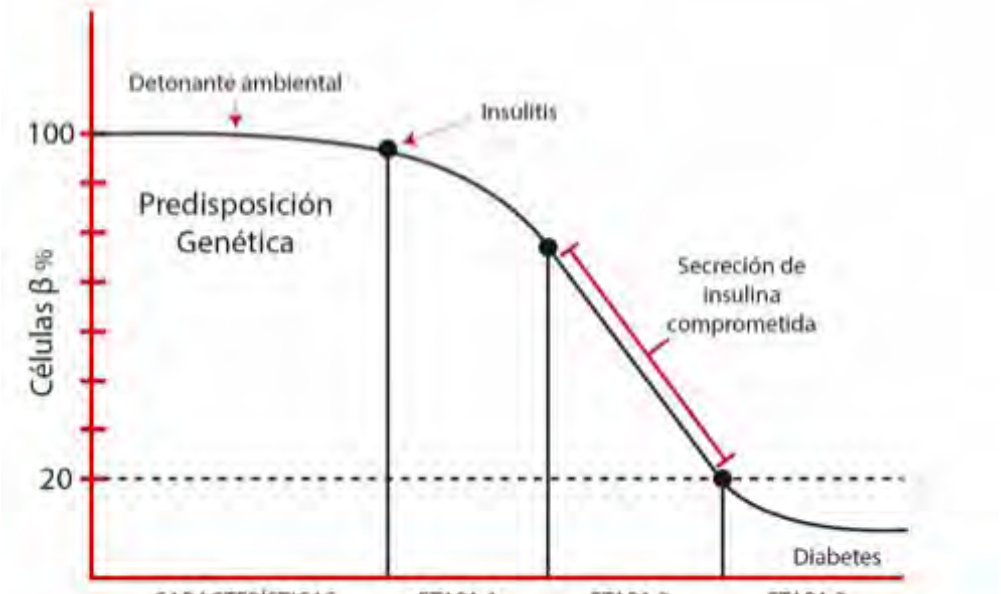
Holt RIG, et al. The Management of Type 1 Diabetes in Adults. A Consensus Report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). Diabetes Care. 2021 Nov;44(11):2589-2625. doi: 10.2337/dci21-0043.

Introducción

- Se asocia con el desarrollo de complicaciones a largo plazo y disminuye la expectativa de vida
- El descubrimiento/uso de insulina transformó la vida de personas con DT1
- El desarrollo de insulina, su forma de administración y las tecnologías para medir la glucosa han cambiado dramáticamente el manejo de la DT1
- A pesar de estos avances muchas personas con DT1 no logran las metas de tratamiento necesarias para prevenir o disminuir la progresión de las complicaciones que generan una carga clínica y emocional importante
- El costo del tratamiento puede resultar catastrófico

Holt RIG, et al. The Management of Type 1 Diabetes in Adults. A Consensus Report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). Diabetes Care. 2021 Nov;44(11):2589-2625. doi: 10.2337/dci21-0043.
Fernández Cantón, et al (2011). Mortalidad por diabetes mellitus en menores de 15 años, México, 2000-2009. Boletín Médico Del Hopital Infantil de México, 68(5), 405–407.DCCT. N. Eng J Med 1993; 329: 977-986 Dra. Gabriela García Galván, Instituto Nacional de Pediatría (Tesis 2011)Altamirano-Bustamante N, Islas-Ortega L, et. al, Economic family burden of metabolic control in children and adolescents with type1 diabetes mellitus., J Pediatr Endocrinol Metab. 2008 Dec;21(12):1163-8.

Historia Natural de la Diabetes Tipo 1



CARACTERÍSTICAS	ETAPA 1	ETAPA 2	ETAPA 3
Autoanticuerpos	+ +	+ + +	+
Metabolismo glucosa	Normal	Disglicemia	Diabetes
Presencia de síntomas	No	No	Sí

Modelo del desarrollo de DM1. Adaptación propia basada en los modelos de Eisenbarth 1986, Powers 2013, Atkinson 2014, Insel 2015.
Faradji Hazán RN, et al: Diabetes mellitus tipo 1: fisiopatología, diagnóstico, epidemiología, cuadro clínico, evolución. . En Ochoa Martínez C, et al, SMNE, CMMI: Manual práctico del manejo de la diabetes mellitus y sus comorbilidades. 1ª edición. Editorial Alfil, 2016. ISBN 9786077411673.

Diabetes tipo 1: un acto de equilibrio difícil

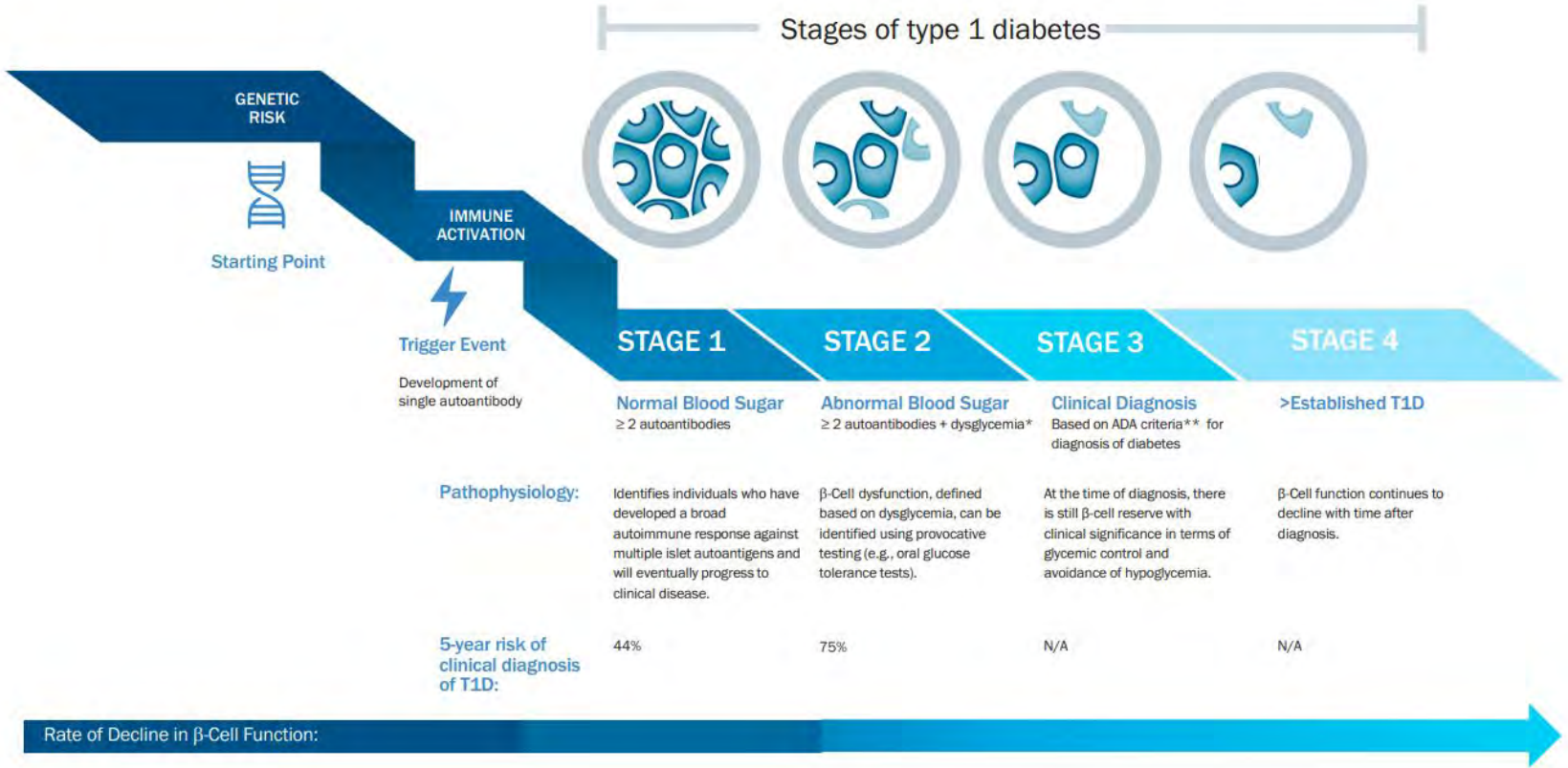
CALIDAD DE VIDA

Adaptado de la Dra. Chantal Mathieu

	Prevalence			Remaining life expectancy if diagnosed at age 10 years in 2021	
	Total*	Age <20 years	Age ≥20 years	Type 1 diabetes, years	Non type 1 diabetes, years†
Global	8 423 530 (8 103 139–8 749 702)	1 476 030 (1 412 988–1 542 713)	6 947 403 (6 670 019–7 228 108)	40 (37–43)	64
High-income countries	4 584 200 (4 435 431–4 742 083)	525 174 (504 759–547 223)	4 059 734 (3 920 799–4 203 710)	61 (57–65)	72
Upper-middle income countries	2 049 417 (1 968 012–2 128 509)	375 345 (356 088–394 971)	1 673 363 (1 606 286–1 740 203)	43 (40–46)	67
Lower-middle income countries	1 574 314 (1 500 333–1 647 053)	499 991 (481 241–519 961)	1 074 211 (1 015 460–1 132 039)	26 (23–28)	62
Low-income countries	215 599 (199 363–232 056)	75 521 (70 901–80 558)	140 096 (127 473–152 156)	13 (12–15)	60
North America	1 690 726 (1 638 926–1 749 197)	199 751 (192 435–208 482)	1 491 369 (1 441 606–1 544 571)	58 (55–61)	70
Canada	276 284 (267 612–285 679)	31 601 (30 182–32 979)	244 671 (236 711–253 080)	63 (60–66)	74
USA	1 414 441 (1 371 314–1 463 518)	168 150 (162 253–175 503)	1 246 698 (1 204 895–1 291 491)	57 (53–60)	70
Latin America and the Caribbean	868 281 (832 566–903 470)	164 693 (156 626–172 852)	703 238 (673 581–733 072)	43 (40–46)	68
Mexico	89 408 (86 764–92 059)	11 414 (11 031–11 835)	78 002 (75 507–80 364)	39 (37–42)	67

Gregory GA, Robinson TIG, Linklater SE, et al. Global incidence, prevalence, and mortality of type 1 diabetes in 2021 with projection to 2040: a modelling study. *Lancet Diabetes Endocrinol*. 2022;10(10):741-760. doi:10.1016/S2213-8587(22)00218-2

Etapas de la DT1

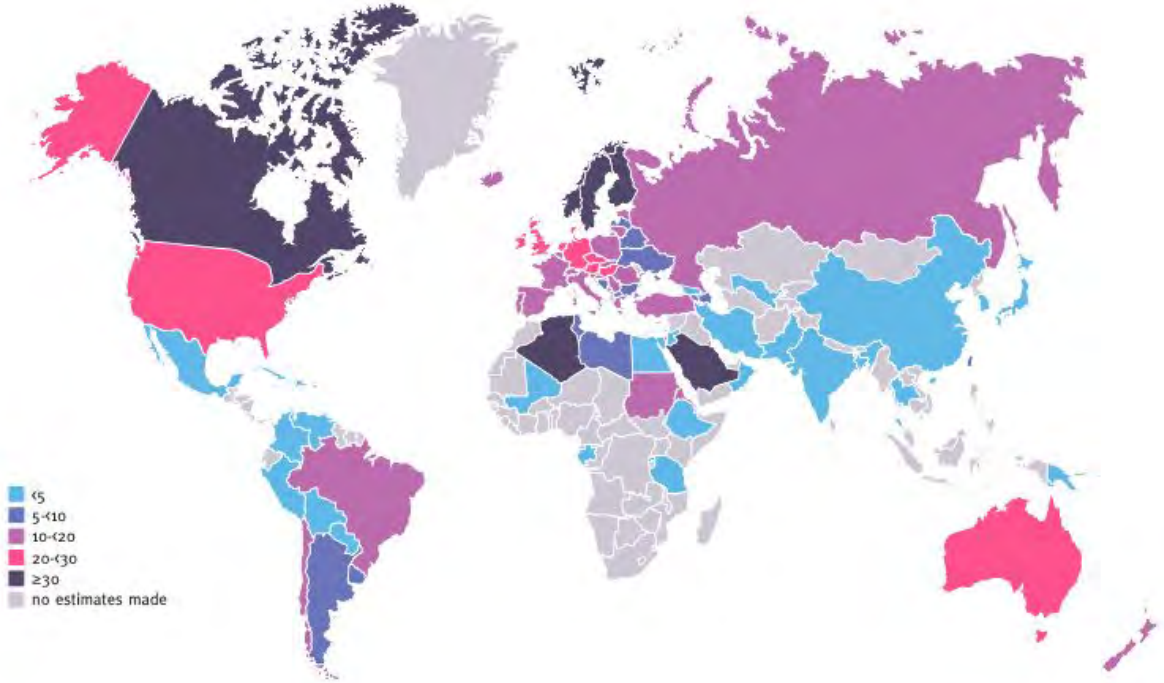


Sims E. et al Diabetes Care 2022; *Adapted from www.TrialNet.org*

Descarga el libro

Faradji- Hazán RN, et al: La Diabetes Tipo 1 a lo Largo de la Vida: La Historia de María Luisa. edición. 2022, Editorial Permanyer, México. ISBN: 8419418390. Contraportada.

Diabetes Tipo 1 a nivel mundial



Tasa de incidencia (por 100,000 personas por año) estandarizada para edad y sexo de diabetes tipo 1 en niños y adolescents de 0 a 14 años.

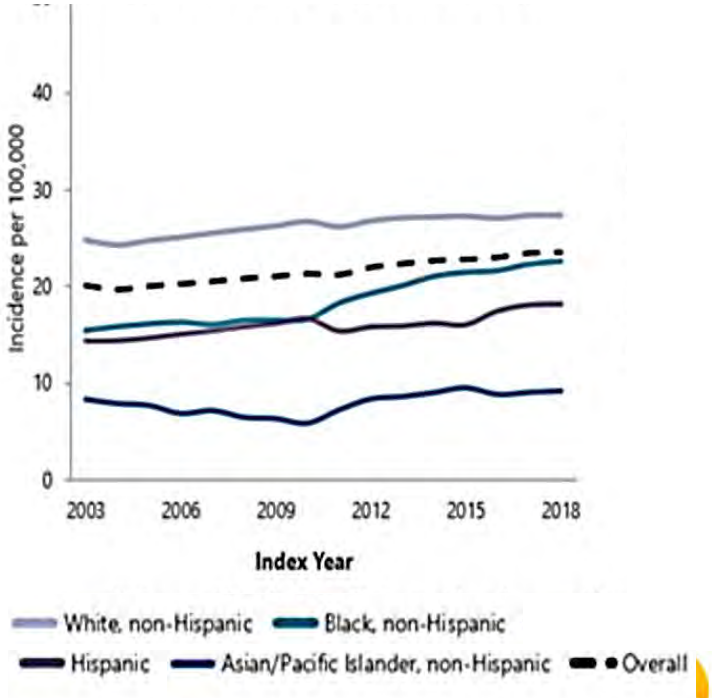
Atlas de la Federación Internacional de Diabetes- 2021 www.diabetesatlas.org

Diabetes tipo 1 a nivel mundial

	Niños y adolescentes de 0-14 años	Niños y adolescentes de 0-19 años
Prevalencia	652,000	1.2 millones
Incidencia*	108,000	149,500

*Número de nuevos casos por año

Tendencia en la incidencia general, por raza y etnicidad de diabetes tipo 1 en niños y adolescentes de 0 a 19 años



Atlas de la Federación Internacional de Diabetes- 2021 www.diabetesatlas.org

Global incidence, prevalence, and mortality of type 1 diabetes in 2021 with projection to 2040: a modelling study

Gabriel A Gregory*, Thomas I G Robinson*, Sarah E Linklater, Fei Wang, Stephen Colagiuri, Carine de Beaufort, Kim C Donaghue, International Diabetes Federation Diabetes Atlas Type 1 Diabetes in Adults Special Interest Group†, Dianna J Magliano, Jayanthi Maniam, Trevor J Orchard, Priyanka Rai, Graham D Ogle

Summary

Background Accurate data on type 1 diabetes prevalence, incidence, associated mortality and life expectancy are crucial to inform public health policy, but these data are scarce. We therefore developed a model based on available data to estimate these values for 201 countries for the year 2021 and estimate the projected prevalent cases in 2040.

Methods We fitted a discrete-time illness-death model (Markov model) to data on type 1 diabetes incidence and type 1 diabetes-associated mortality to produce type 1 diabetes prevalence, incidence, associated mortality and life expectancy in all countries. Type 1 diabetes incidence and mortality data were available from 97 and 37 countries respectively. Diagnosis rates were estimated using data from an expert survey. Mortality was modelled using random-forest regression of published type 1 diabetes mortality data, and life expectancy was calculated accordingly using life tables. Estimates were validated against observed prevalence data for 15 countries. We also estimated missing prevalence (the number of additional people who would be alive with type 1 diabetes if their mortality matched general population rates).

Findings In 2021, there were about 8·4 (95% uncertainty interval 8·1–8·8) million individuals worldwide with type 1 diabetes: of these 1·5 million (18%) were younger than 20 years, 5·4 million (64%) were aged 20–59 years, and 1·6 million (19%) were aged 60 years or older. In that year there were 0·5 million new cases diagnosed (median age of onset 39 years), about 35 000 non-diagnosed individuals died within 12 months of symptomatic onset. One fifth (1·8 million) of individuals with type 1 diabetes were in low-income and lower-middle-income countries. Remaining life expectancy of a 10-year-old diagnosed with type 1 diabetes in 2021 ranged from a mean of 13 years in low-income countries to 65 years in high-income countries. Missing prevalent cases in 2021 were estimated at 3·7 million. In 2040, we predict an increase in prevalent cases to 13·5–17·4 million (60–107% higher than in 2021) with the largest relative increase versus 2021 in low-income and lower-middle-income countries.

Interpretation The burden of type 1 diabetes in 2021 is vast and is expected to increase rapidly, especially in resource-limited countries. Most incident and prevalent cases are adults. The substantial missing prevalence highlights the premature mortality of type 1 diabetes and an opportunity to save and extend lives of people with type 1 diabetes. Our new model, which will be made publicly available as the Type 1 Diabetes Index model, will be an important tool to support health delivery, advocacy, and funding decisions for type 1 diabetes.

Funding JDRF International.

Lancet Diabetes Endocrinol 2022; 10: 741–60

Published Online September 13, 2022 https://doi.org/10.1016/S2213-8587(22)00218-2

See Comment page 688

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Gregory GA, Robinson TIG, Linklater SE, et al. Global incidence, prevalence, and mortality of type 1 diabetes in 2021 with projection to 2040: a modelling study. *Lancet Diabetes Endocrinol.* 2022;10(10):741-760. doi:10.1016/S2213-8587(22)00218-2

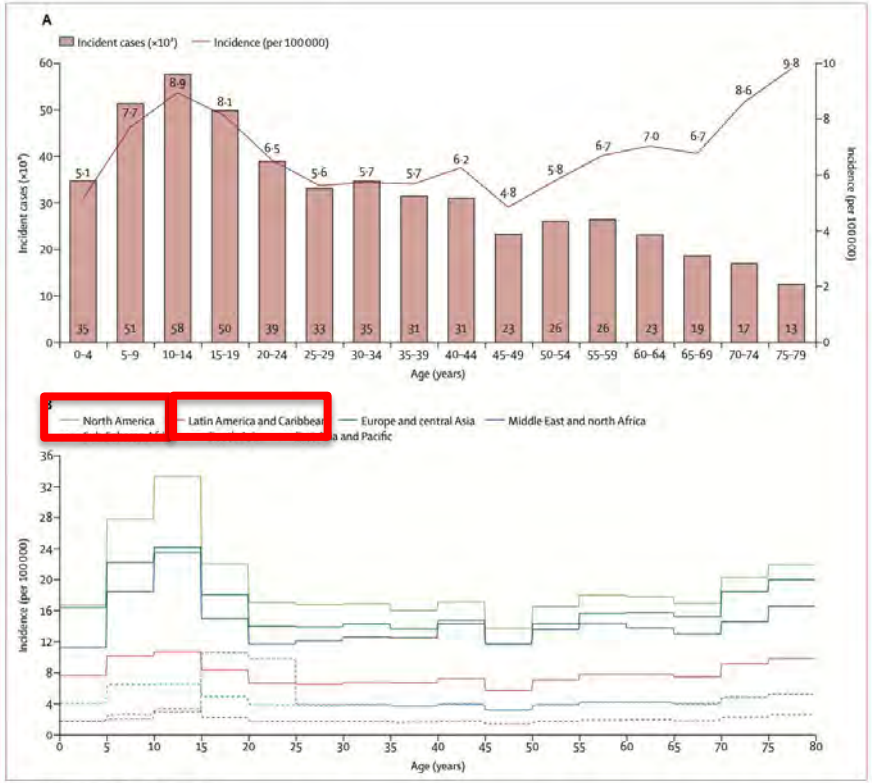
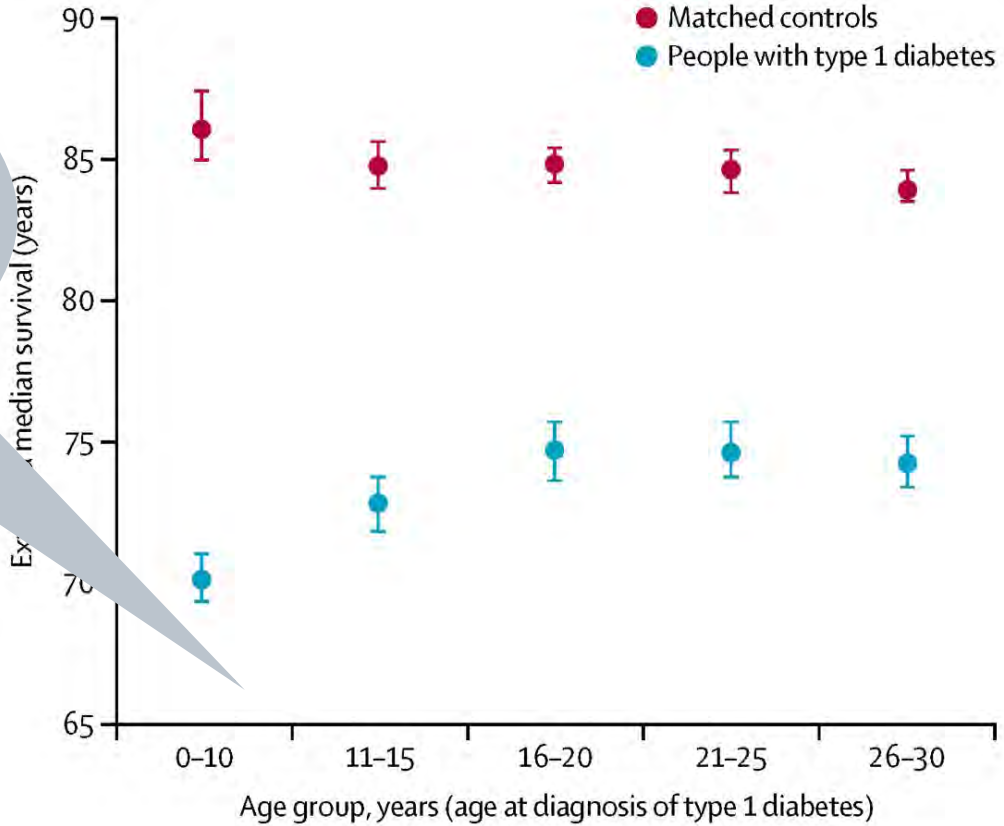


Figure 3: Type 1 diabetes incidence, 2021
(A) Global incident cases and incidence, by age. (B) Incidence by age group and region.

Gregory GA, Robinson TIG, Linklater SE, et al. Global incidence, prevalence, and mortality of type 1 diabetes in 2021 with projection to 2040: a modelling study. *Lancet Diabetes Endocrinol*. 2022;10(10):741-760. doi:10.1016/S2213-8587(22)00218-2

Años de vida perdidos en relación a la edad al diagnóstico de DT1

Hombres diagnosticados antes de los 10 años de edad **pierden 14.2 años-vida** (95% IC 12.1–18.2).
Mujeres diagnosticadas antes de los 10 años de edad **pierden 17.7 años-vida** (95% IC 14.5–20.4).



Rawshani A *et al*. Lancet

Diabetes Tipo 1 en México

La información disponible en relación a la prevalencia, prácticas de tratamiento y seguimiento de los pacientes con DT1 en México es limitada.

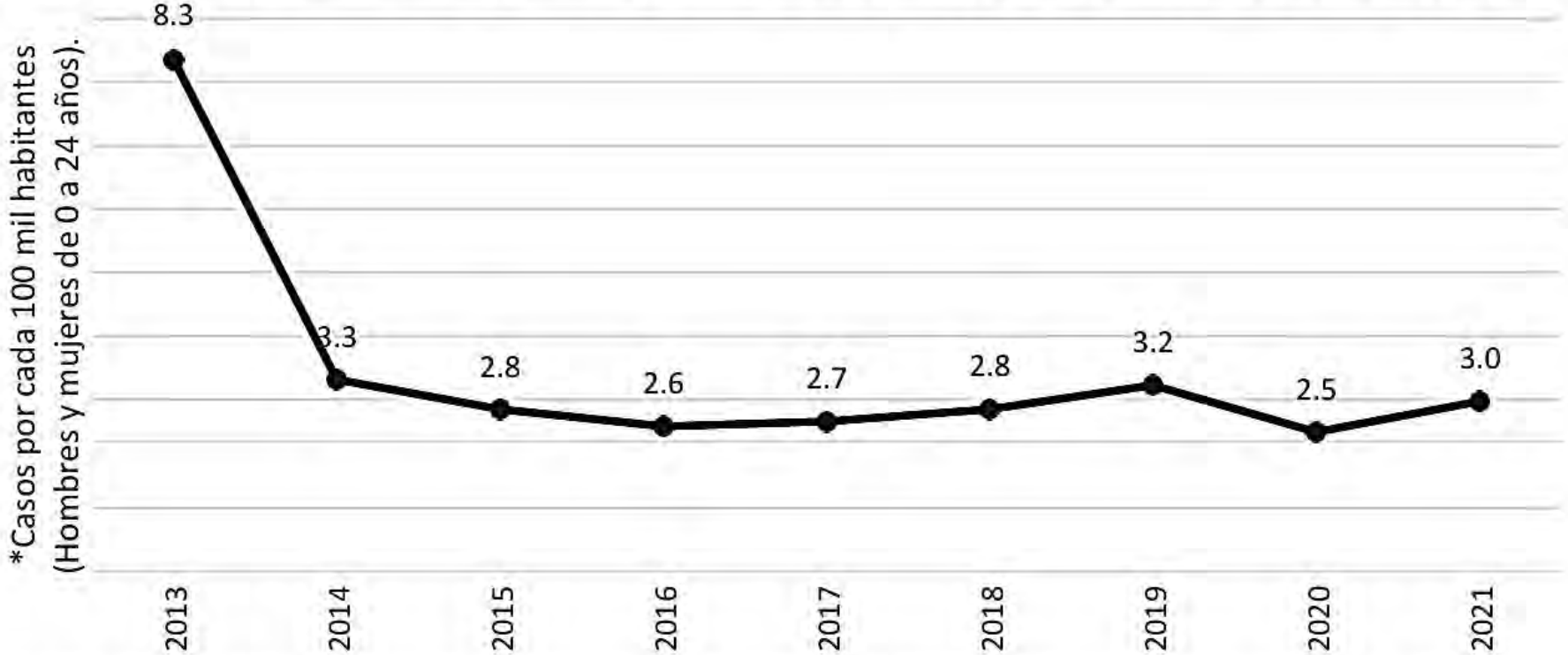
Estudio	Lugar	Año	Incidencia DT1 (casos por 100,000 habitantes)
1. DIAMOND	Veracruz Boca del Río	1993	1.15
2. IMSS	Derechohabientes	2000 - 2010	3.4 a 6.2
3. Secretaria de Salud Dirección General de Epidemiología OMENT	Nacional	2019	5.67

El **Atlas 2019 de la Federación Internacional de Diabetes (4)**, reportó una prevalencia de 26,578 casos de DT1 en la población de 0 a 19 años

En **2021** la incidencia de DT1 reportada en México fue de **3.0 por 100,000 habitantes**[5].

1.Rueda OA, et al Diabetes Care. 1998. p. 1372–3. 2. Gómez-Díaz RA, et al Diabetes Care. 2012 Nov;35(11):e77.
3. Secretaria de de Salud S. Panorama Epidemiológico de las Enfermedades No Transmisibles en México [Internet]. [cited 2021 Nov 7].
4 Saeedi P, Diabetes Res Clin Pract. 2019 Nov;157:107843.
5. https://www.gob.mx/salud/documentos/panorama-epidemiologico-de-las-enfermedades-no-transmisibles-en-mexico-269304

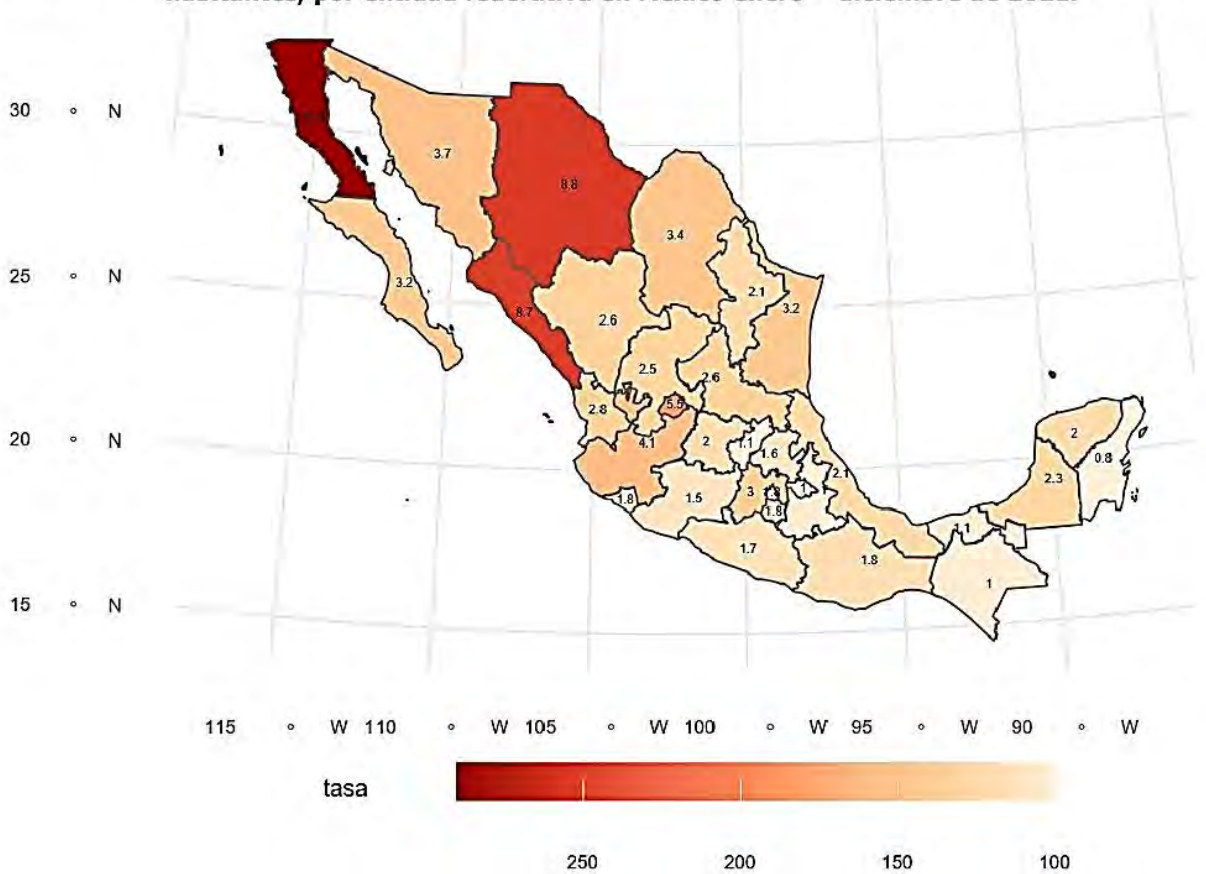
Gráfico 5 Tasa de incidencia* de diabetes mellitus tipo I al segundo semestre, del año 2013 a 2021.



Fuente: Sistema Único Automatizado para la Vigilancia Epidemiológica (SUAVE). Información hasta la SE 52 de 2021.

https://www.gob.mx/salud/documentos/panorama-epidemiologico-de-las-enfermedades-no-transmisibles-en-mexico-269304

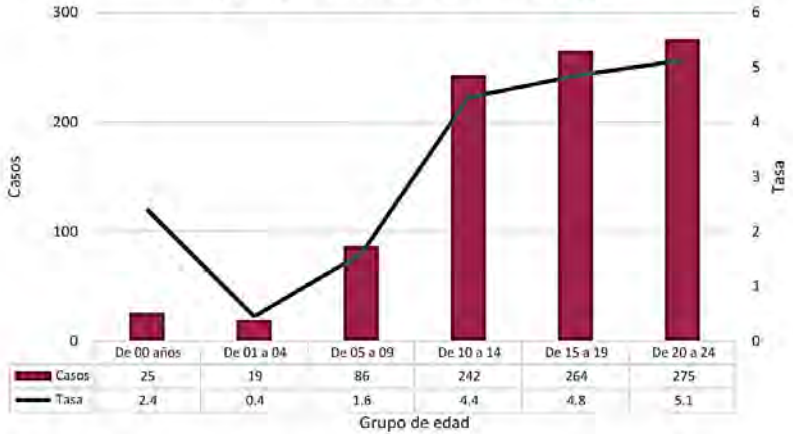
Figura 2 Tasa de incidencia de diabetes mellitus insulinodependiente (tipo 1), por cada 100 mil habitantes, por entidad federativa en México enero - diciembre de 2021.



Fuente: Sistema Único Automatizado para la Vigilancia Epidemiológica (SUAVE). Información hasta la SE 52 de 2021.

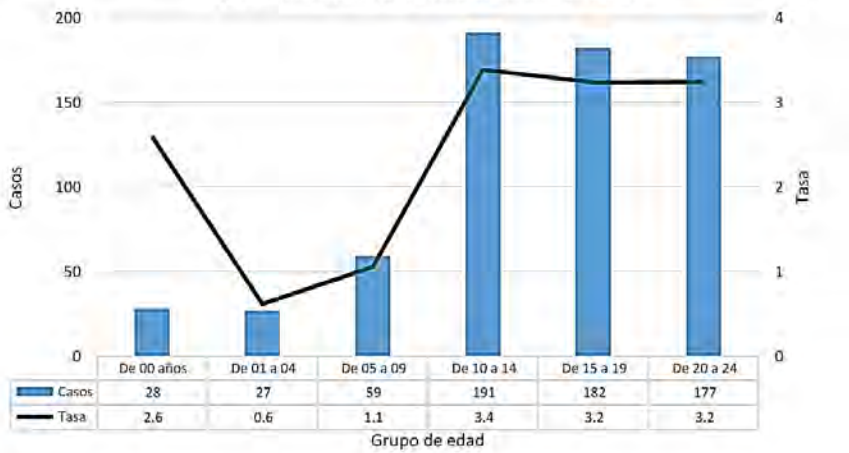
https://www.gob.mx/salud/documentos/panorama-epidemiologico-de-las-enfermedades-no-transmisibles-en-mexico-269304

Gráfico 6 Tasa de incidencia y casos acumulados de diabetes mellitus insulinodependiente, tipo 1, en mujeres. México enero-diciembre de 2021.



Fuente: Sistema Único Automatizado para la Vigilancia Epidemiológica (SUAVE). Información hasta la SE 52 de 2021.

Gráfico 7 Tasa de incidencia y casos acumulados de diabetes mellitus insulinodependiente, tipo 1, en hombres. México enero-diciembre de 2021.



https://www.gob.mx/salud/documentos/panorama-epidemiologico-de-las-enfermedades-no-transmisibles-en-mexico-269304

Importancia de los Registros de DT1 a nivel mundial

- Conocer la incidencia y prevalencia de DT1
- Conocer:
  - Tratamiento
  - Grado de control metabólico
  - Complicaciones
  - Mortalidad
- Aumentar la calidad de atención de las personas que viven con DT1
- Conocer resultados reportados por pacientes (patient reported outcomes-PRO)
- **Incidir en políticas de salud pública**

Bak JCG, Serné EH, Kramer MHH, Nieuwdorp M, Verheugt CL. National diabetes registries: do they make a difference?. *Acta Diabetol*. 2021;58(3):267-278. doi:10.1007/s00592-020-01576-8

Registros de Diabetes Tipo 1 en el mundo

DIAMOND- Mundial

EURODIAB- Europeo

NDR Suecia https://www.ndr.nu/#/english

FinDM Finlandia

NDR-A Noruega

DPV- Alemán https://dive-register.de/

SWEET https://www.sweet-project.org

T1D Exchange- EUA https://t1dexchange.org

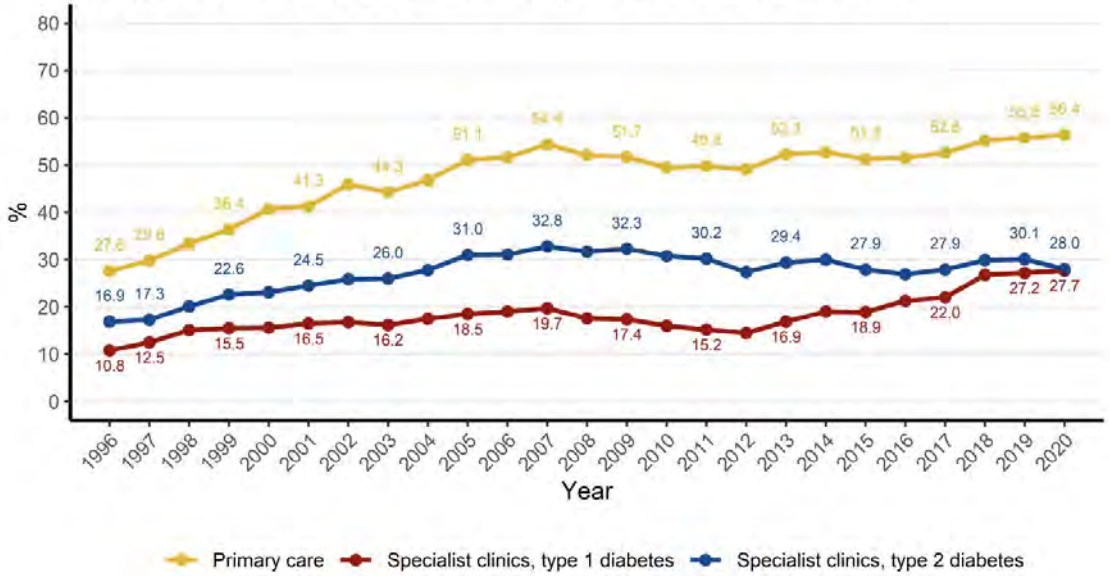
SEARCH- EUA

Registros de Diabetes Tipo 1 en el mundo

NDR Suecia https://www.ndr.nu/#/english

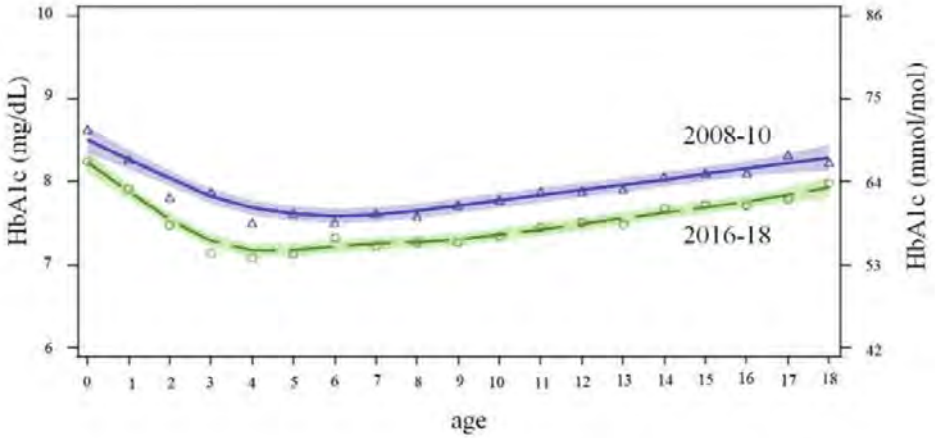
NDR NATIONELLA DIABETESREGISTRET

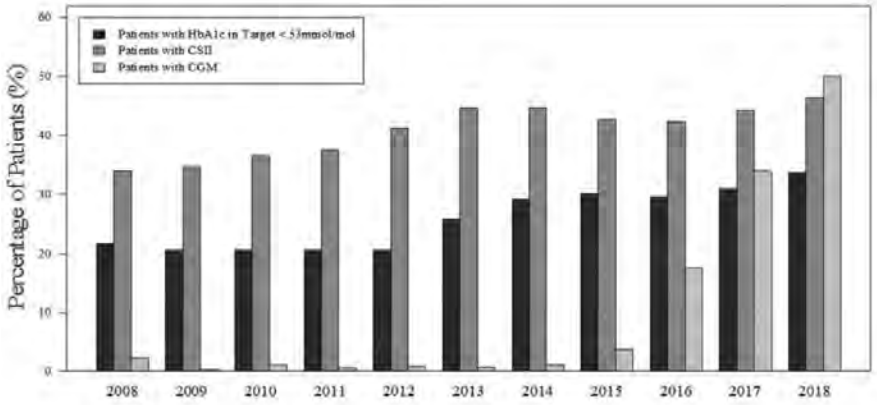
Figure 13. Proportions of patients with Hba1c < 52 mmol/mol (6.9% NGSP) over time in primary care, in type 1 diabetes and type 2 diabetes in specialist clinics.



Registros de Diabetes Tipo 1 en el mundo

SWEET https://www.sweet-project.org



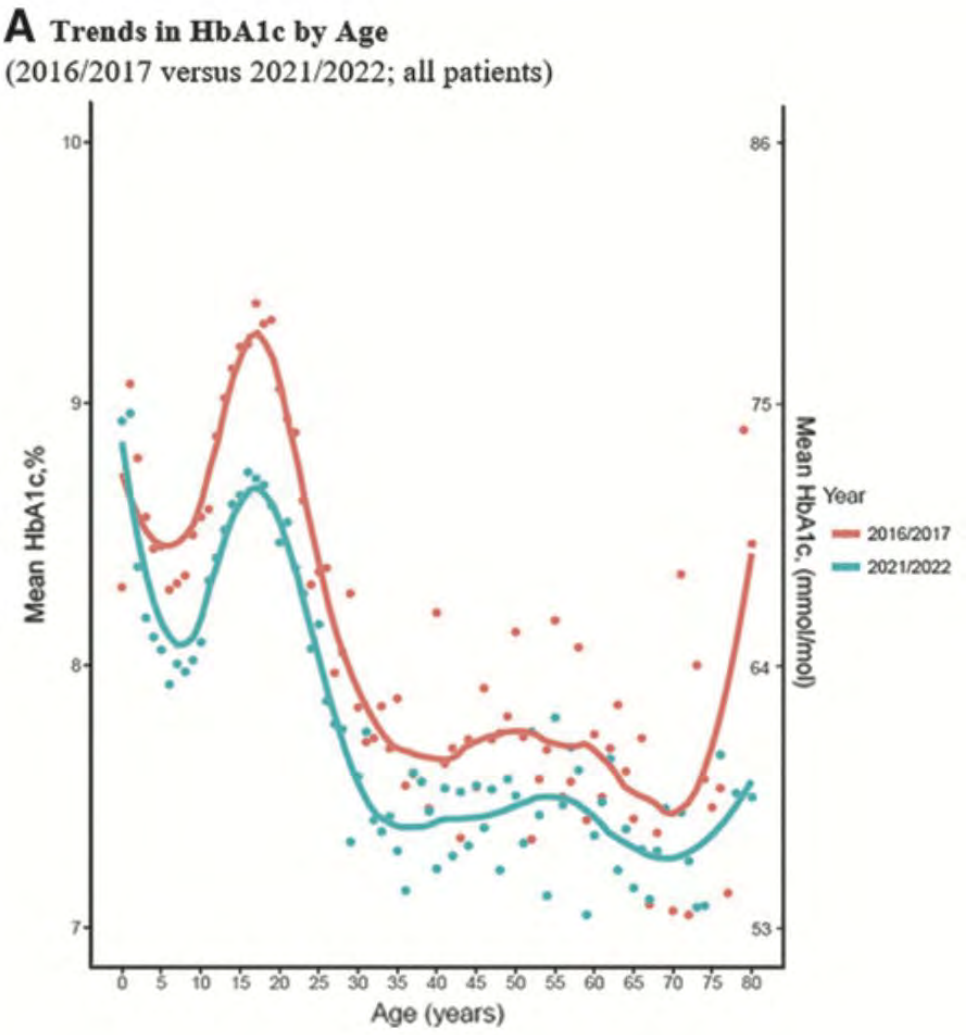


Gerhardsson P et al The SWEET Project 10-Year Benchmarking in 19 Countries Worldwide Is Associated with Improved HbA1c and Increased Use of Diabetes Technology in Youth with Type 1 Diabetes. *Diabetes Technol Ther*. 2021;23(7):491-499. doi:10.1089/dia.2020.0618

T1D Exchange

>20,000 pacientes con DT1 registados

67% de los pacientes con DT1 no logran control a pesar del aumento en uso de la tecnología



Ebekozien O, Mungmode A, Sanchez J, Rompicherla S, Demeterco-Berggren C, Weinstock RS, Jacobsen LM, Davis G, McKee A, Akturk HK, Maahs DM, Kamboj MK. Longitudinal Trends in Glycemic Outcomes and Technology Use for Over 48,000 People with Type 1 Diabetes (2016-2022) from the T1D Exchange Quality Improvement Collaborative. Diabetes Technol Ther. 2023 Nov;25(11):765-773. doi: 10.1089/dia.2023.0320. Epub 2023 Oct 16. PMID: 37768677.

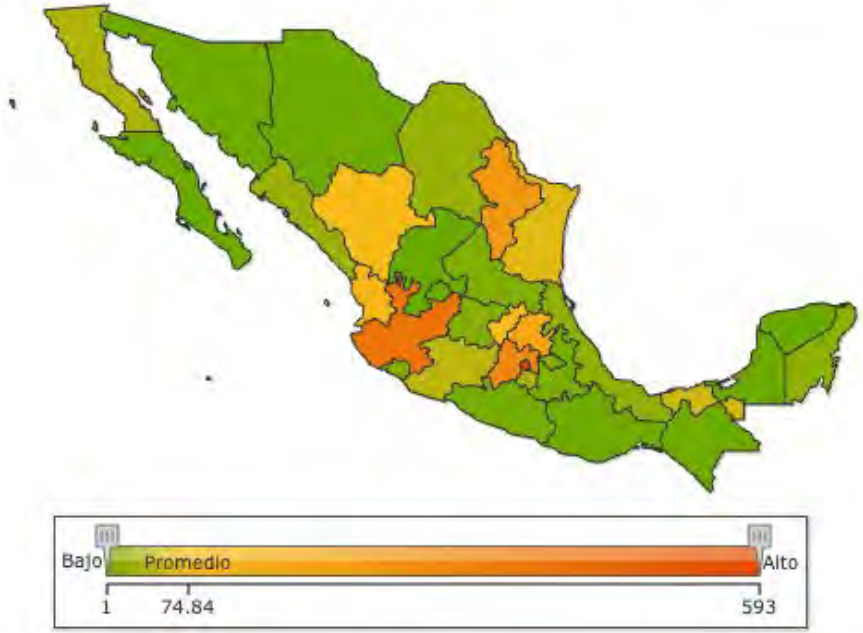
RENACED- DT1 ® Profesional

- Permite acceso a los registros médicos de pacientes en varias unidades médicas
- Desarrollada con apego a estándares de seguridad, ética y confidencialidad
- Permite tener datos confiables de prevalencia, grado de control y complicaciones de los pacientes con DT1
- Utiliza el CURP para evitar duplicidad
- Análisis a nivel nacional no permite ver los datos personales
- Apoyado por la Sociedad Mexicana de Nutrición y Endocrinología (SMNE)

Registro Nacional de Pacientes con Diabetes Tipo 1

Pacientes por Estado de Residencia

Total: 2395



Datos al 13/5/2024

Formulario de Google...

CENSIDA

FIND
FUNDACIÓN INVESTIGACIÓN EN DIABETES A. C.

Red Ciudadana por el Derecho a la Salud
DT1
de las Personas con Diabetes Tipo 1
1er Foro Ciudadano por el Derecho a la Salud de las Personas con Diabetes Tipo 1
Martes 11 de noviembre de 2014

RENACED1

2011

Surge la idea de formar un registro de personas que viven con DT1

2012

Se inicia la colaboración con CENSIDA

2013

Se obtiene apoyo de FIND para construir la plataforma

2014

Versión 1.0 de la plataforma Foro Comisión Derechos Humanos

2015

Se pilotea por 5 miembros de la SMNE en CDMX, Guadalajara, Monterrey, Tepic, Hidalgo

2016

Se inicia la colaboración con la SMNE, surge el Grupo RENACED-DT1 desde el grupo de trabajo de diabetes.

2017

Ponencias en Congreso FMD,
Reunión Anual del SINAVE
(Sistema Nacional de Vigilancia Epidemiológica)
Reuniones en la Dirección General de Epidemiología.

2018

INCMNSZ se suma al proyecto.
Se obtiene apoyo por parte de Sanofi México a través de la SMNE para generar la versión 3.0 de la plataforma profesional y construir la plataforma personal

2019

Posters y ponencias en AACE, ATTD, FMD, Foro DT1 en México, Senado de la República.
Inicia la construcción de la plataforma personal

2019

Reuniones de desarrollo de la plataforma personal

2020

Pandemia frena el avance. Trabajo en publicaciones en Salud Pública de México,

2021

Publicación en Diabetes Research and Clinical Practice Lanzamiento de Renaced Personal

RenaceDT1 Personal

RENACED-DT1 Profesional

RENACED-DT1: A National Type 1 Diabetes Registry Initiative in Mexico

Dear editor: Type 1 diabetes (T1D) is one of the most common chronic diseases in childhood, it is not preventable, and if not treated with insulin, is mortal. Suboptimal insulin treatment increases the risk of complications.[1]

According to Mexican Institute for Social Security (*Instituto Mexicano del Seguro Social*, IMSS), the T1D incidence in <19 years-old increased from 3.4 to 6.2/100 000 between 2000 and 2010.[2] The 2017 morbidity yearbook

salud pública de méxico / vol. 62, no. 3, mayo-junio de 2020

Most frequent treatment is basal-bolus with insulin analogues (61%); 21% use insulin-pumps and 9% use continuous glucose monitoring, the latter mostly in the private sector. Mean glycated hemoglobin A1c at last follow-up was 8.7±2.1% (72±23 mmol/mol).

Faradji RN,et al, RENACED-DT1: A national type 1 diabetes registry initiative in Mexico. Salud Publica Mex 2020;62(3):232-4.

RENACED-DT1 Profesional

- 965 pacientes
- 61 % mujeres
- Edad media al entrar a la base de datos: 21 años
- Edad media al diagnóstico 11 años
- Duración media de diabetes ~ 8.2 años
- 21% tratados con microinfusora, 61% con basal bolo con inyecciones (MID)
- 33.3 monitorean su glucosa capilar ≥ 4 veces al día
- 9% usan monitoreo continuo de glucosa (MCG)
- HbA1c promedio 8.7%
  - 18% debajo de 7.0%
  - 35% arriba de 9%

Faradji RN,et al, RENACED-DT1: A national type 1 diabetes registry initiative in Mexico. Salud Publica Mex 2020;62(3):232-4.

RENACED-DT1
Profesional

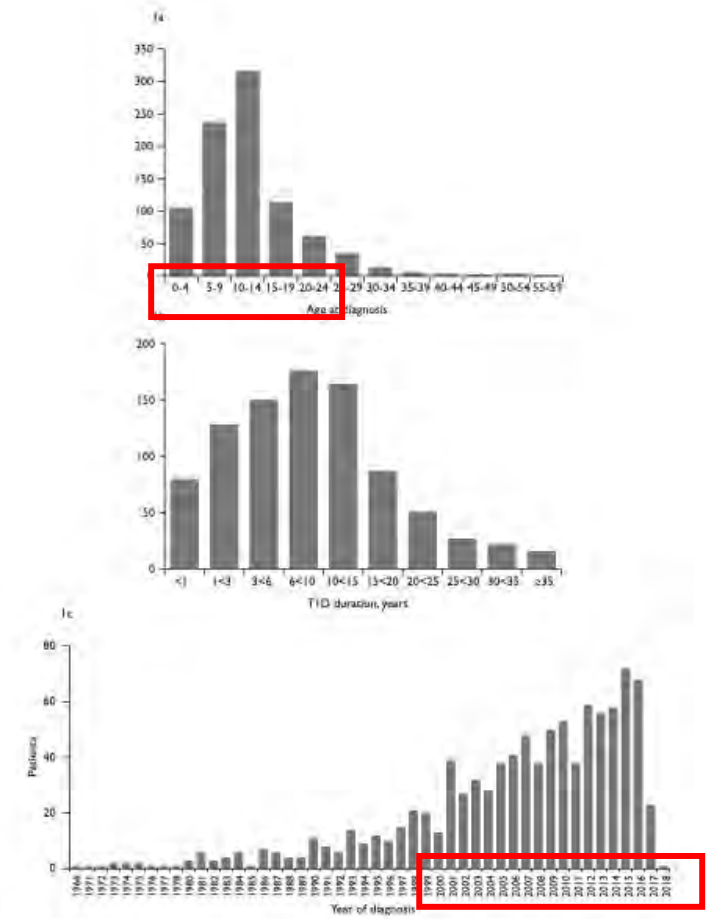


Figure 1. Selected characteristics of cases registered in the RENACED type 1 diabetes registry in Mexico. 1a. Age at diagnosis. 1b. Type 1 diabetes duration in years. 1c. Year of type 1 diabetes diagnosis

Faradji RN,et al, RENACED-DT1: A national type 1 diabetes registry initiative in Mexico. Salud Publica Mex 2020;62(3):232-4.

Resultados RENACED-DT1 Profesional

Rev Invest Clin. (ahead of print) ORIGINAL ARTICLE

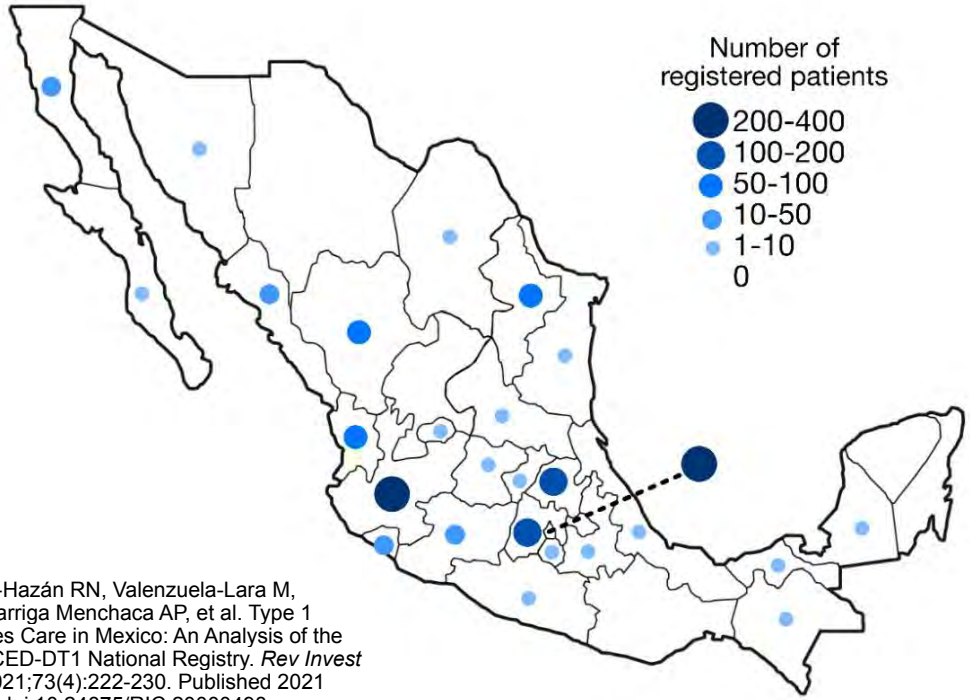
Type 1 Diabetes Care in Mexico: An Analysis of the RENACED-DT1 National Registry

Raquel N. Faradji-Hazán[1,2*], Marisol Valenzuela-Lara[3], Ana P. Díaz-Barriga Menchaca[2], Paloma Almeda-Valdes[4], Neftali E. Antonio-Villa[4,5], Maricela Vidrio-Velázquez[6], Laura Islas-Ortega[7], Angélica Martínez-Ramos-Méndez[8], Natalia E. de la Garza-Hernández[9], Jorge F. Bustamante-Martínez[10], Karla L. Sánchez-Ruiz[11], Alicia E. Yepez-Rodríguez[12], Guillermo González-Gálvez[13], Ricardo S. Niño-Vargas[14], María E. Sainz de la Maza-Viadero[1], and Carlos Magis-Rodríguez[15], on behalf of RENACED Diabetes Tipo 1 Research Group

[1]Clínica EnDi, Mexico City; [2]School of Medicine, Instituto Tecnológico de Monterrey, Mexico City; [3]Centro Nacional para la Prevención y el Control del VIH y el Sida, Mexico City; [4]Department of Endocrinology and Metabolism, Metabolic Diseases Research Unit, Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán (INCMyNSZ), Mexico City; [5]MD/PhD Programa de Estudios Combinados en Medicina (PECEM) Program, Faculty of Medicine, Universidad Nacional Autónoma de México (UNAM), Mexico City; [6]Department of Endocrinology, Hospital General Regional # 110, Instituto Mexicano del Seguro Social (IMSS), Guadalajara, Jal.; [7]Pediatric Endocrinology Service, Hospital del Niño DIF Hidalgo, Pachuca, Hgo., Mexico; [8]Pediatric Endocrinology Service, Hospital Español, Mexico City; [9]Private Practice in Endocrinology, Centro Médico Integral (CEMEDIN), Mty., NL, Mexico; [10]Department of Internal Medicine, Servicios de Salud de Nayarit- Hospital General de Tepic, Nay., Mexico; [11]Clínica de Diabetes, Secretaría de Salud del Estado de Durango, Dgo., Mexico; [12]Internal Medicine and Endocrinology Service, Corporativo Hospital Satélite, Mex., Mexico; [13]Instituto Jalisciense de Investigación en Diabetes y Obesidad, Guadalajara, Jal.; [14]Centro para la Prevención y Atención Integral del VIH/SIDA de la Ciudad de México, Mexico City; [15]Faculty of Medicine, UNAM, Mexico City, Mexico

Faradji-Hazán RN, Valenzuela-Lara M, Díaz-Barriga Menchaca AP, et al. Type 1 Diabetes Care in Mexico: An Analysis of the RENACED-DT1 National Registry. *Rev Invest Clin*. 2021;73(4):222-230. Published 2021 May 4. doi:10.24875/RIC.20000498

Resultados RENACED-DT1 Profesional



n=1035

- Mediana de edad en años: 21 (1-81)
- Edad al dx: 11 años (IC 7-15)
- Duración de diabetes (mediana) 8.2 años
- IMC:
  - < 25 57.6 %
  - 25-30 34.3 %
  - > 30 8.1 %

- Promedio de HbA1c: 8.7%
  - <7% - 18%
  - 7-9% - 47%
  - >9% - 35%

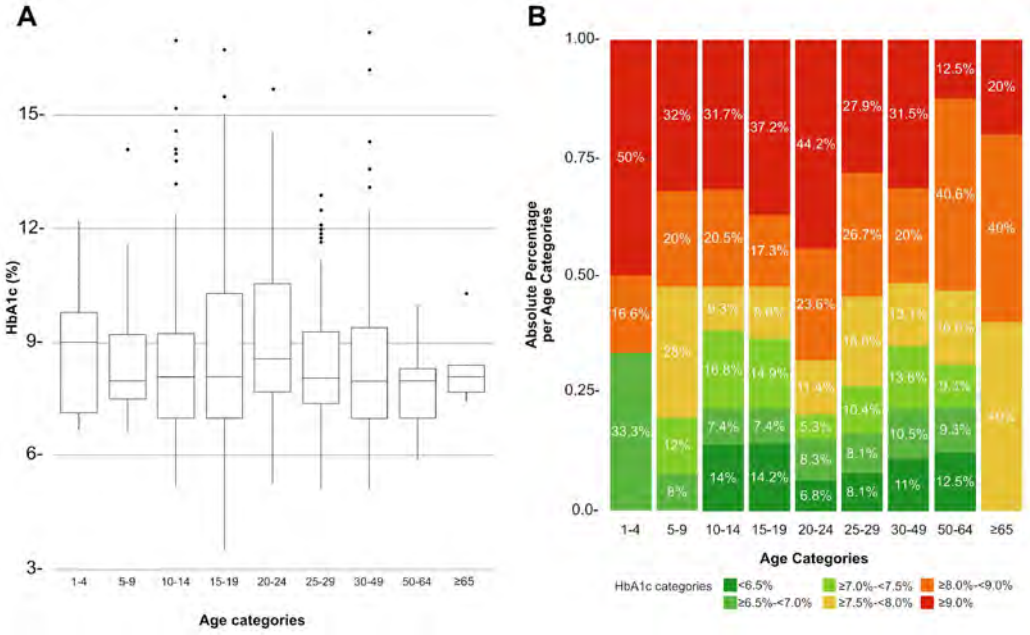
Faradji-Hazán RN, Valenzuela-Lara M, Díaz-Barriga Menchaca AP, et al. Type 1 Diabetes Care in Mexico: An Analysis of the RENACED-DT1 National Registry. *Rev Invest Clin*. 2021;73(4):222-230. Published 2021 May 4. doi:10.24875/RIC.20000498

Resultados RENACED-DT1 Profesional

- **Monitoreo de glucosa capilar ≥ 4 veces/día se asocia con HbA1c < 7%.**
- Las complicaciones microvasculares se asocian con:
  - duración de diabetes > 10 años
  - sexo femenino
  - IMC ≥ 30 kg/m2
  - presencia de cualquier hipoglucemia
  - monitoreo de glucosa capilar < 4 veces/día

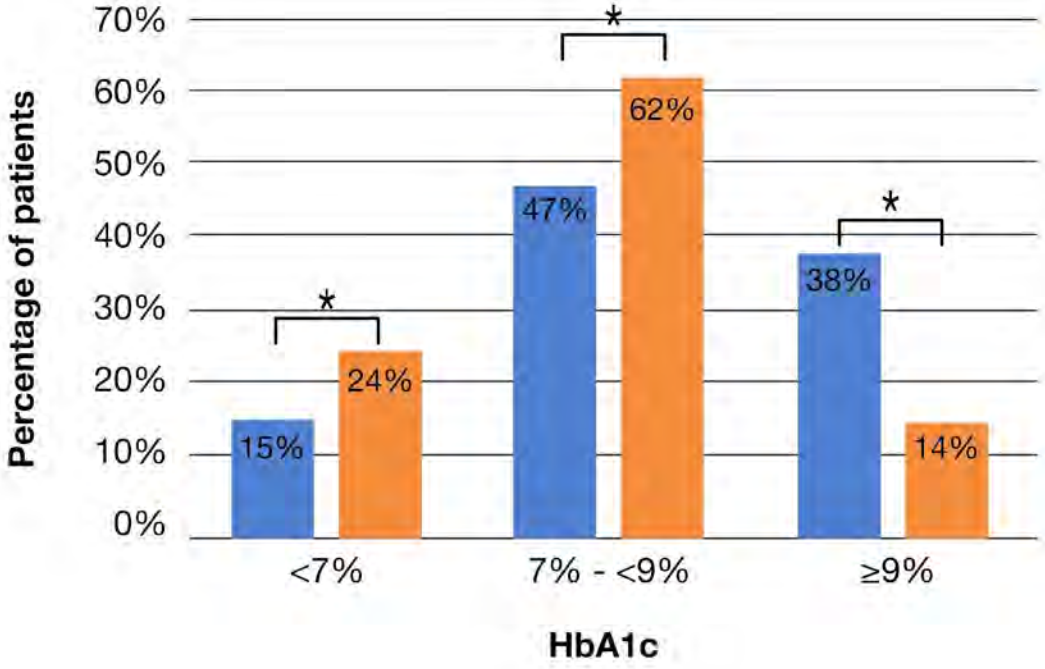
Faradji-Hazán RN, Valenzuela-Lara M, Díaz-Barriga Menchaca AP, et al. Type 1 Diabetes Care in Mexico: An Analysis of the RENACED-DT1 National Registry. *Rev Invest Clin*. 2021;73(4):222-230. Published 2021 May 4. doi:10.24875/RIC.20000498

RENACED-DT1 Profesional:
Distribución de HbA1c por grupo de edad



Faradji-Hazán RN, Valenzuela-Lara M, Díaz-Barriga Menchaca AP, et al. Type 1 Diabetes Care in Mexico: An Analysis of the RENACED-DT1 National Registry. *Rev Invest Clin*. 2021;73(4):222-230. Published 2021 May 4. doi:10.24875/RIC.20000498

RENACED-DT1 Profesional
Microinfusora vs basal bolo



Basal-bolus
Insulin pump
*p<0.001

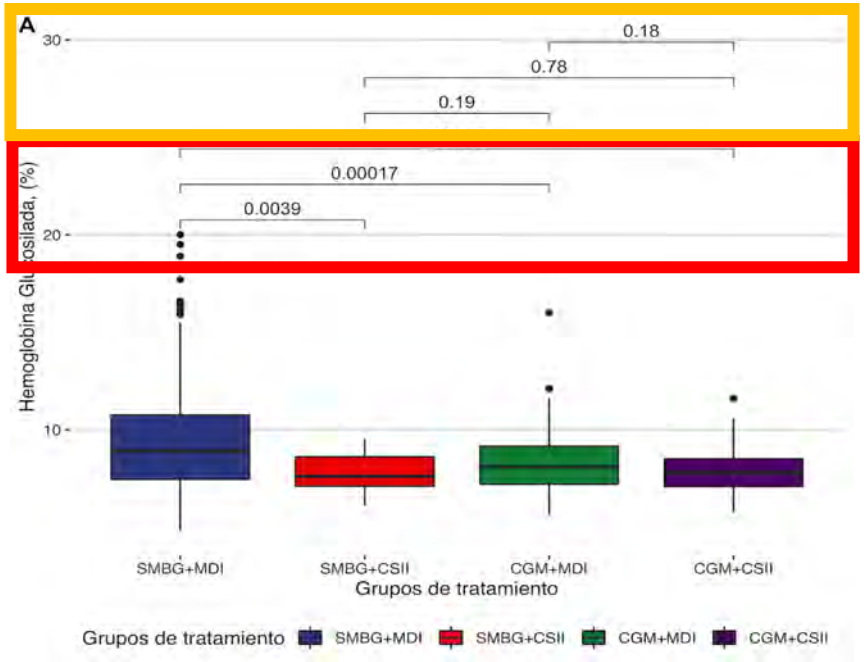
MID
ICSI

MID- múltiples inyecciones diarias
ICSI- infusión subcutánea continua de insulina

Faradji-Hazán RN, Valenzuela-Lara M, Díaz-Barriga Menchaca AP, et al. Type 1 Diabetes Care in Mexico: An Analysis of the RENACED-DT1 National Registry. *Rev Invest Clin.* 2021;73(4):222-230. Published 2021 May 4. doi:10.24875/RIC.20000498

RENACED-DT1 Profesional

La tecnología aumenta la probabilidad de tener mejor control glucémico (HbA1c <7.0%)



SMBG- automonitoreo capilar de glucosa
MDI- MID- múltiples inyecciones diarias
CGM- MCG-monitoreo continuo de glucosa
CSII-ICSI- infusión continua subcutánea de insulina

Antonio-Villa NE, et al: El Monitoreo Continuo de Glucosa acompañado de la Infusión Continua Subcutánea de Insulina se asocia a concentración más baja de HbA1c. RME. 2020; 7: Supl 1. p 11 (D251).

RENACED-DT1 Profesional Privado vs Público

DIABETES RESEARCH AND CLINICAL PRACTICE 180 (2021) 109038

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Diabetes Research and Clinical Practice

journal homepage: www.elsevier.com/locate/diabres

ELSEVIER

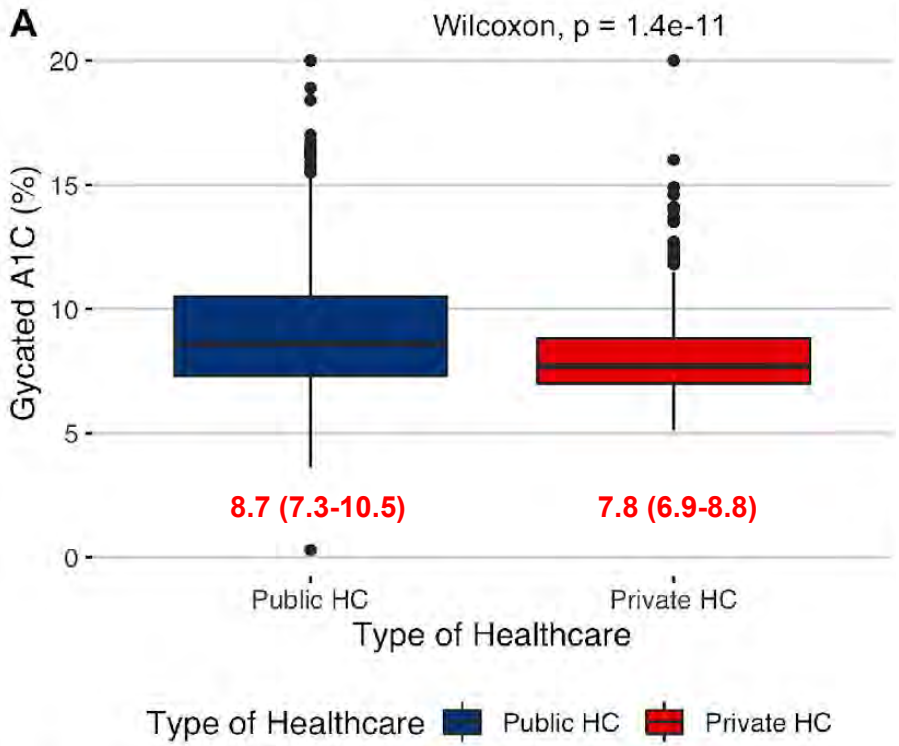
International Diabetes Federation

Glycemic control, treatment and complications in patients with type 1 diabetes amongst healthcare settings in Mexico

Neftali Eduardo Antonio-Villa M.D. [a,b,1,2], *Aili García-Tuomola M.D.* [c,x,1,3], *Paloma Almeda-Valdes M.D.* [b,c,1,4], *Maricela Vidrio-Velázquez M.D.* [d], *Laura Islas-Ortega M.D.* [e], *Juan R. Madrigal-Sanromán M.D.* [f], *Carmenmari Zaballa-Lasso* [g], *Angélica Martínez-Ramos-Méndez M.D.* [h], *Natalia E. De la Garza-Hernández M.D.* [i], *Jorge F. Bustamante-Martínez M.D.* [j], *Guillermo González-Galvez M.D.* [k], *Mayra Valadez-Capetillo M.D.* [l], *Karla L. Sanchez-Ruiz M.D.* [m], *Carmen Castillo-Galindo M.D.* [f], *Alicia E. Yepez-Rodríguez M.D.* [n], *Miguel A. Polanco-Preza M.D.* [o], *Jose J. Ceballos-Macías M.D.* [p], *Julio C. Valenzuela-Montoya M.D.* [q], *Ana R. Escobedo-Ortiz M.D.* [r], *Aldo Ferreira-Hermosillo M.D.* [s], *Ester Rodríguez-Sanchez M.D.* [t], *Alejandro Romero-Zazueta M.D.* [u], *Sigfrido Miracle-López M.D.* [v], *Mario H. Figueroa-Andrade M.D.* [w], *Raquel N. Faradji M.D.* [f,x,*,5], *for the RENACED-DT1 Research Group*

Antonio-Villa NE, García-Tuomola A, Almeda-Valdes P, et al. Glycemic control, treatment and complications in patients with type 1 diabetes amongst healthcare settings in Mexico. Diabetes Res Clin Pract. 2021;180:109038. doi:10.1016/j.diabres.2021.109038

RENACED-DT1 Profesional Privado vs Público

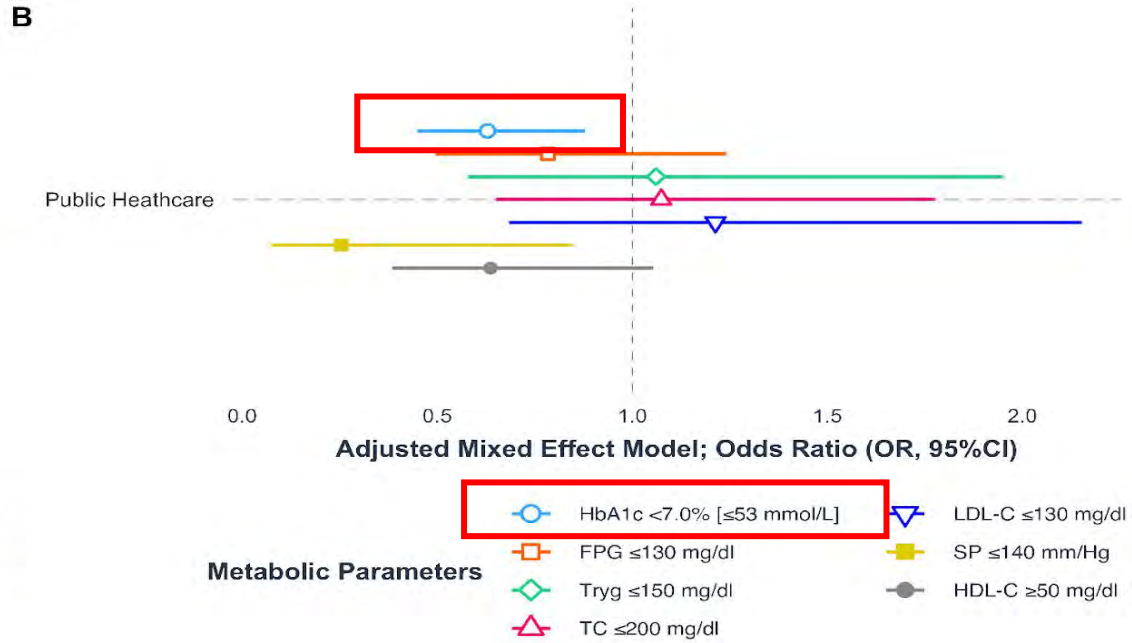


n=1603

Privado n= 457
Público n= 1146

Antonio-Villa NE, García-Tuomola A, Almeda-Valdes P, et al. Glycemic control, treatment and complications in patients with type 1 diabetes amongst healthcare settings in Mexico. Diabetes Res Clin Pract. 2021;180:109038. doi:10.1016/j.diabres.2021.109038

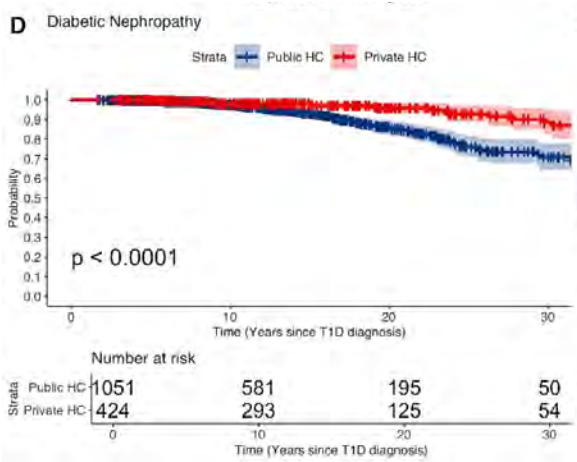
RENACED-DT1 Profesional Privado vs Público



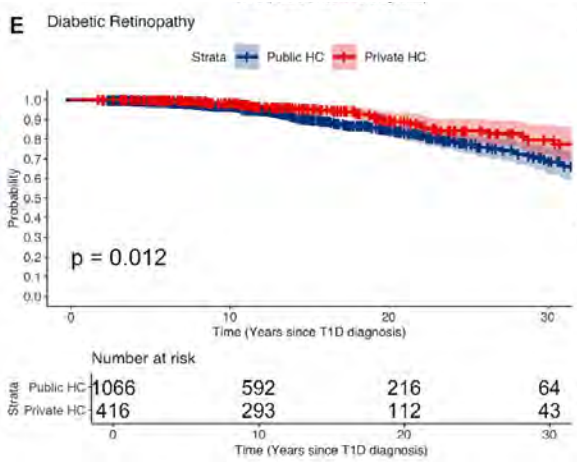
Antonio-Villa NE, García-Tuomola A, Almeda-Valdes P, et al. Glycemic control, treatment and complications in patients with type 1 diabetes amongst healthcare settings in Mexico. Diabetes Res Clin Pract. 2021;180:109038. doi:10.1016/j.diabres.2021.109038

RENACED-DT1 Profesional Privado vs Público

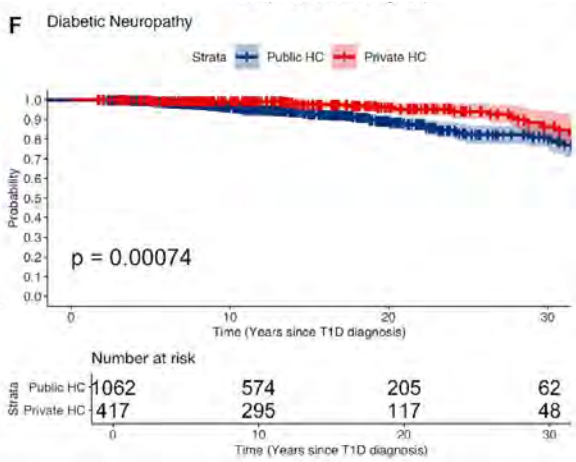
Nefropatía



Retinopatía



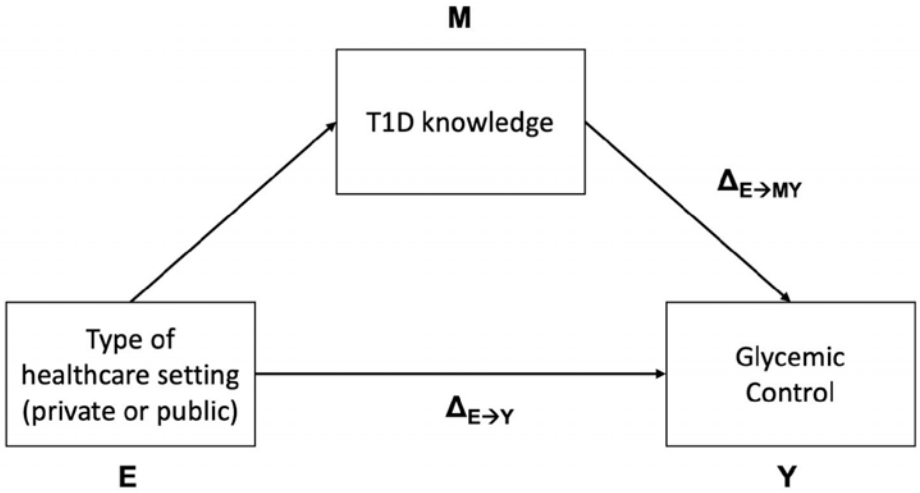
Neuropatía



Riesgo de complicaciones en los pacientes que reciben atención en los medios públicos vs privados a lo largo del tiempo

Antonio-Villa NE, García-Tuomola A, Almeda-Valdes P, et al. Glycemic control, treatment and complications in patients with type 1 diabetes amongst healthcare settings in Mexico. Diabetes Res Clin Pract. 2021;180:109038. doi:10.1016/j.diabres.2021.109038

RENACED-DT1 Profesional Privado vs Público



Encontramos que:

- el conocimiento en diabetes explica el 29.2% del efecto sobre el control glucémico (HbA1c), independientemente del medio de atención.
- la educación, además, tiene un impacto en la glucosa en ayunas, triglicéridos, colesterol LDL, incidencia de cetoacidosis diabética y eventos de hipoglucemia.

Antonio-Villa NE, García-Tuomola A, Almeda-Valdes P, et al. Glycemic control, treatment and complications in patients with type 1 diabetes amongst healthcare settings in Mexico. Diabetes Res Clin Pract. 2021;180:109038. doi:10.1016/j.diabres.2021.109038

RENACED-DT1 Profesional Privado vs Público

- Las personas que viven con DT1, que reciben atención en el sistema público de salud, tienen:
  - Una probabilidad menor de llegar a metas terapéuticas
  - Un mayor riesgo de desarrollar complicaciones crónicas de DT1
- El conocimiento en diabetes es un mediador para obtener un mejor control glucémico.
- Las diferencias en el acceso al tratamiento completo y educación entre los entornos públicos y privados se deben de analizar y resolver.

Antonio-Villa NE, García-Tuomola A, Almeda-Valdes P, et al. Glycemic control, treatment and complications in patients with type 1 diabetes amongst healthcare settings in Mexico. Diabetes Res Clin Pract. 2021;180:109038. doi:10.1016/j.diabres.2021.109038

CARDIOVASCULAR RISK AND LDL CHOLESTEROL LEVELS IN ADULTS WITH TYPE 1 DIABETES: ANALYSIS OF RENACED-DT1

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Background and aims

Coronary artery disease is the leading cause of death in people with type 1 diabetes (T1D).

The aim of this study is to assess cardiovascular disease (CVD) risk, LDL-cholesterol (LDL-C) levels and current lipid lowering treatment in patients registered in the T1D National Registry in Mexico (RENACED-DT1).

Methods:

Patients with T1D >18 years of age registered in RENACED-DT1 were classified for CVD risk according to the European Society of Cardiology (ESC) 2019 Guidelines*. They were classified according to ESC categories in VERY HIGH (>20 years of T1D and/or end-organ damage LDL-C goal of <55mg/dl), HIGH (>10 years of T1D and/or three risk factors, LDL-C goal of <70 mg/dl) or MODERATE risk (under 35 years of age or less than 10 years of T1D, LDL-C goal of <100mg/dl) **(Figure 1).**

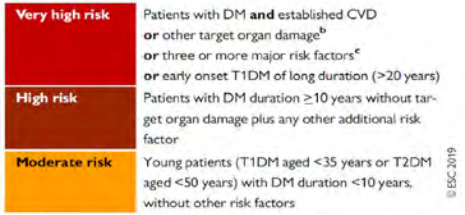


Figure 1

Results

644 individuals with T1D were included. Most were classified as HIGH risk (n= 295, 46%), 249 (39%) as very HIGH risk and only 100 (15%) as MODERATE risk **(Tables 1 and 2).**

Chracteristics	Total n = 644	Moderate n = 100	High n = 295	Very High n = 249	p
Gender, (%) Female Male	 396 (61) 248 (39)	 56 (56) 44 (44)	 178 (60) 117 (40)	 162 (65) 87 (35)	 0.2
Age (years)	32 (24, 43)	22 (20, 27)	28 (23, 37)	42 (34, 51)	<0.001
Diabetes duration (years)	11 (4, 19)	4 (1, 6)	9 (4, 14)	21 (13, 29)	<0.001
BMI, (kg/m²)	23.7 (21.5, 26.3)	22 (20.2, 24.1)	23.5 (21.5, 26)	24.6 (22.3, 27.9)	<0.001
Normal weight (%) Overweight (%) Obese (%)	417 (65) 169 (26) 58 (9)	85 (85) 15 (15) 0 (0)	198 (67%) 84 (28%) 13 (4.4%)	134 (54) 70 (28) 45 (18)	<0.001
Smoking (%)	50 (7.8)	0 (0)	20 (6.8)	30 (12)	<0.001
HbA1c, (%)	8.3 (7.2, 10.0)	7.6 (6.8, 8.9)	8.6 (7.3, 10.8)	8.2 (7.2, 9.6)	<0.001
Triglycerides, (mg/dl)	95 (70, 140)	74 (64, 92)	104 (72, 153)	102 (73, 149)	<0.001
Total cholesterol (mg/dl)	173 (151, 199)	151 (138, 160)	180 (156, 202)	178 (155, 211)	<0.001
LDL-c (mg/dl)	98 (80, 120)	87 (77, 96)	105 (84, 125)	99 (82, 126)	<0.001
HDL- c (mg/dl)	50 (41, 60)	48 (41, 54)	47 (40, 58)	53 (43, 64)	<0.001

Table 1

Chracteristics	Total n = 644	Moderate n = 100	High n = 295	Very High n = 249	p
Hypoglycemia history (%) Severe hypoglycemia (%)	140 (22) 19 (3.0)	11 (11) 0 (0)	64 (22) 6 (2)	65 (26) 13 (5.2)	0.008 0.014
Any cause hospitalization (%)	23 (3.6)	0 (0)	11 (3.7)	12 (4.8)	0.056
Statin treatment (%)	122 (19)	2 (2)	39 (13)	81 (33)	<0.001
Fibrate treatment (%)	18 (2.8)	0 (0)	10 (3.4)	8 (3.2)	0.200
Diabetic retinopathy (%)	122 (19)	0 (0)	0 (0)	122 (49)	<0.001
Diabetic nephropathy (%)	91 (14)	1 (1)	16 (5.4)	74 (30)	<0.001
Diabetic neuropathy (%)	90 (14)	5 (5)	25 (8.5)	60 (24)	<0.001
Cardiovascular disease (%)	8 (1.2)	0 (0)	0 (0)	8 (3.2)	0.001

Table 2

LDL-C recommended levels were only achieved in 4% of VERY HIGH risk patients, 13% of HIGH risk and 79% of MODERATE risk patients **(Figure 2).** The use of statins according to risk levels was: 33% in the VERY HIGH risk group, 13% in the HIGH risk group and 2% in the MODERATE risk group.

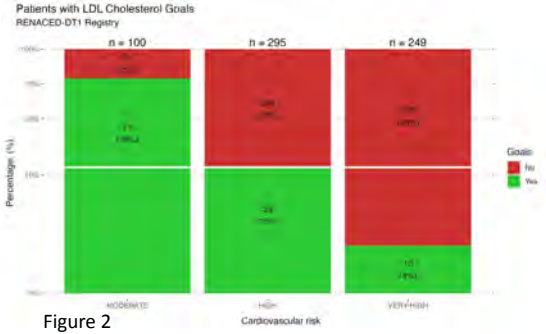


Figure 2

Conclusions

Only a very low percentage of patients from RENACED-DT1 reach LDL-C treatment goals and receive treatment according to their risk category. Considering CVD is the leading cause of death in this population, risk assessment and appropriate treatment are essential.

*Mach F, Baigent C, Catapano AL, et al. 2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk. Eur Heart J. 2020;41(1):111-188. doi:10.1093/eurheartj/ehz455

@RenaceDT1
https://www.renaced-diabetestipo1.mx/.

RENACED1 Diabetes Tipo 1

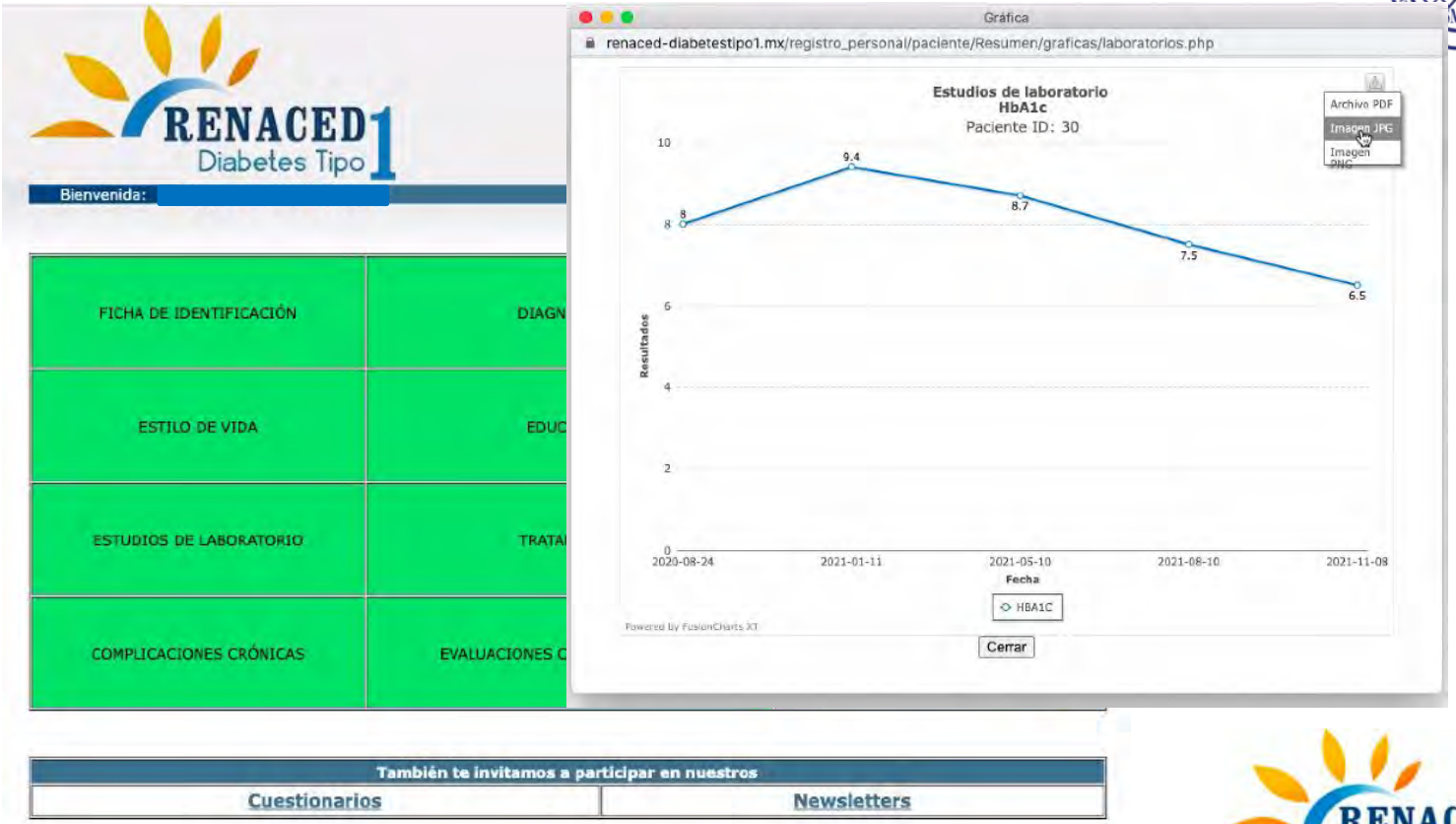
RENACED DT1 Personal ®

- La Diabetes tipo 1 es una enfermedad invisible en México
- Un registro de personas que viven con DT1 nos puede ayudar a visibilizarla.
- El conocimiento y la información obtenidos de los registros y la investigación han llevado a cambios favorables para las personas que viven con DT1 en el mundo.
- El registro personal, además de ayudar a generar información y facilitar cambios en políticas públicas, ayudará a que las personas que viven con DT1 puedan llevar un mejor seguimiento de su condición.

Renaced Personal

https://renaced-diabetestipo1.mx/registro_personal/

RENACED-DT1 Personal



RENACED-DT1 Personal- resumen para imprimir

ÚLTIMO EVENTO			
Hipoglucemia inadvertida:	SI	Hipoglucemia de 54 a 70:	4 A 7
Hipoglucemia de menor de 54:	1 A 3	Hipoglucemia severa:	1 VEZ
Uso de Glucagon:	SI	Cetoacidosis:	SI

COMPLICACIONES CRÓNICAS			
Daño en los ojos:	SI Junio 2018	Daño en los riñones:	SI Mayo 2019
Disminución en la sensibilidad y dolor en los nervios:	SI Enero 2017		

EVALUACIONES COMPLEMENTARIAS	
Revisión con Endocrinólogo en Noviembre de 2020	Revisión de fondo de ojo en Agosto de 2020
Revisión de pies en Marzo de 2019	Prueba de microalbúmina en Febrero de 2018
Revisión con Odontólogo en Julio de 2020	

Versión para Imprimir | Regresar al Inicio

Áreas de oportunidad y reflexiones finales

- Representatividad del registro
- Control de calidad/revisión del registro
- Personal dedicado en el país para enriquecer el registro
- Participación con registros internacionales
- RENACED personal, aplicación para teléfono móvil
- Incidir en políticas de salud pública
- Mejorar la calidad de atención de las personas que viven con DT1
- Asegurar el acceso al tratamiento completo a todas las personas que viven con DT1

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- Sociedad Mexicana de Nutrición y Endocrinología, A.C. (SMNE)
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https://www.renaced-diabetestipo1.mx/

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Aval académico

https://bit.ly/diplomadomanejodiabetesinsulina

Clínica EnDi

¡Gracias por su atención!

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