UNIVERSITÀ DEGLI STUDI DI MILANO
FACOLTÀ DI MEDICINA E CHIRURGIA

Malattia di Chagas

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LA ENFERMEDAD DE CHAGAS-MAZZA, UN MAL LATINOAMERICANO

Dr. César Lorenzano[1]

Salvador Mazza (1886-1946)

Mazza, por su parte, no fue un impostor. Fue uno de los fundadores de la parasitología argentina, el que más investigó y difundió todos los aspectos de la enfermedad de Chagas, no dejando nada por fuera de su curiosidad insaciable, corroborando o refutando hasta el menor de los detalles. Muere, probablemente, de la misma enfermedad que combatió con todas sus fuerzas. Su proverbial mal carácter lo lleva a menospreciar a Romaña. Pero esto es un argumento ad-hominem, que no puede empañar su obra científica. Su menciona a la tripanosomiasis am

Chagas disease in the Argentine Republic

by

Salvador Mazza, M. D.

Chief of the Mission of Studies of Argentine Regional Pathology of the University of Buenos Aires

(Mision de Estudios de Patologia Regional (M.E.P.R.A.) de la Universidad de Buenos Aires)

Shortly after the discovery of American Trypanosomiasis by Carlos Chagas in Brazil, this disease, justly named after this Brazilian worker, was recognized in Argentina, being described by Lozano, Maggio and Rosenbusch at two Lectures given in Buenos Aires in 1911 to the Argentine Society of Public Hygiene and Sanitary Engineering, at which they exihibited specimens obtained from the Oswaldo Cruz Institute, showing the parasite, the insect vector and the principal lesions then known of Chagas' Disease, which had been discovered two years before in the State of Minas Geraes in Brazil.

Seroprevalence of five neglected parasitic diseases among immigrants accessing five infectious and tropical diseases units in Italy: a cross-sectional study

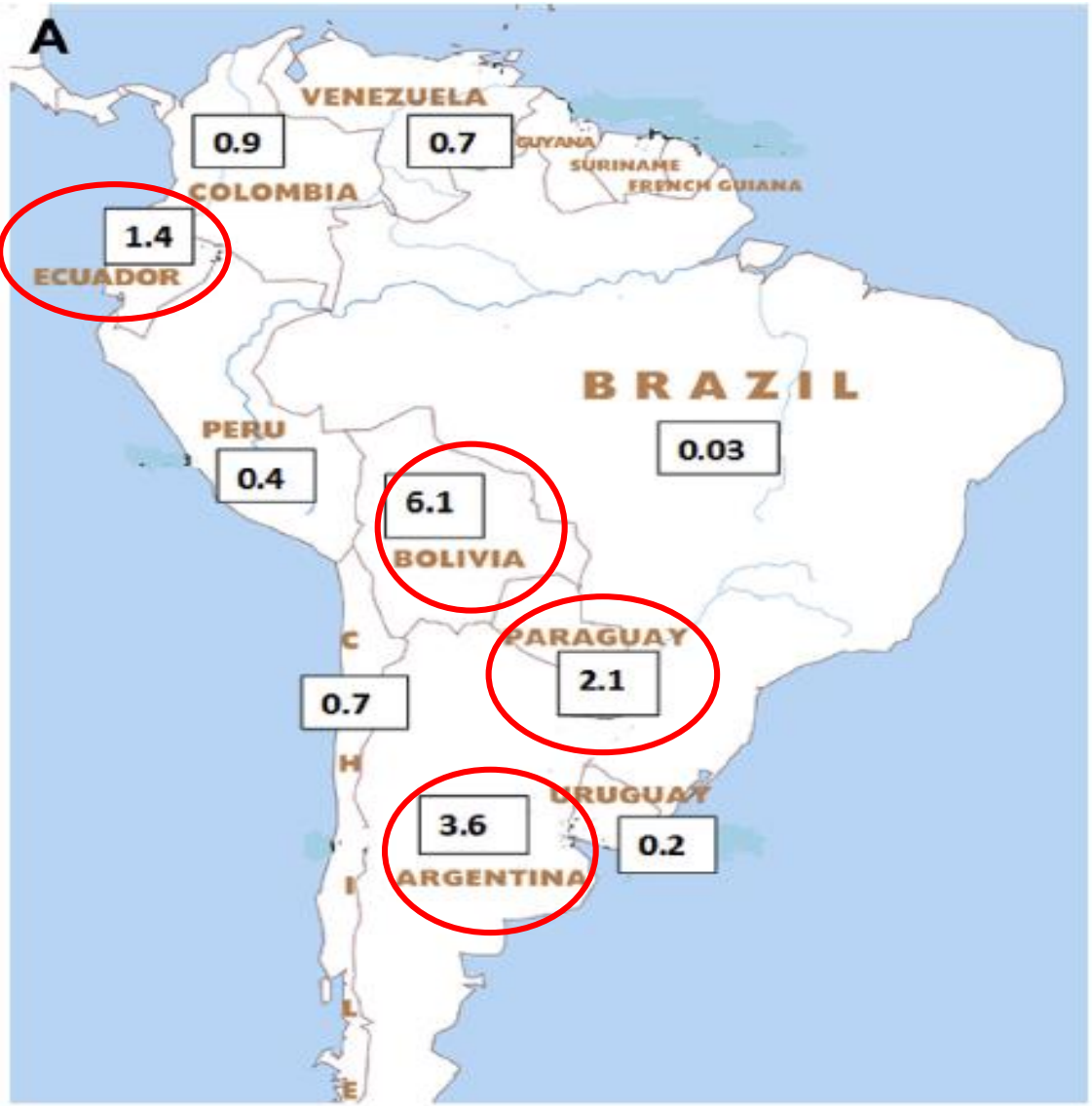
G. Martelli [1, *, †], C. Di Girolamo [2, 3, †], L. Zammarchi [4, 5], A. Angheben [6], M. Morandi [7], S. Tais [8], M. Degani [8], I. El Hamad [9], S. Caligaris [10], A. Ciannameo [2], E. Grilli [11], L. Urbinati [10], G.B. Monteiro [6], C. Scarcella [9], N. Petrosillo [11], M. Digaetano [1, 12], L. Rabbi [1], N. Bazzanini [1, 13], F. Cacciatore [2], B.L. Marta [2], M.L. Moro [7], A. Bartoloni [4, 5], P. Viale [1], G. Verucchi [1]

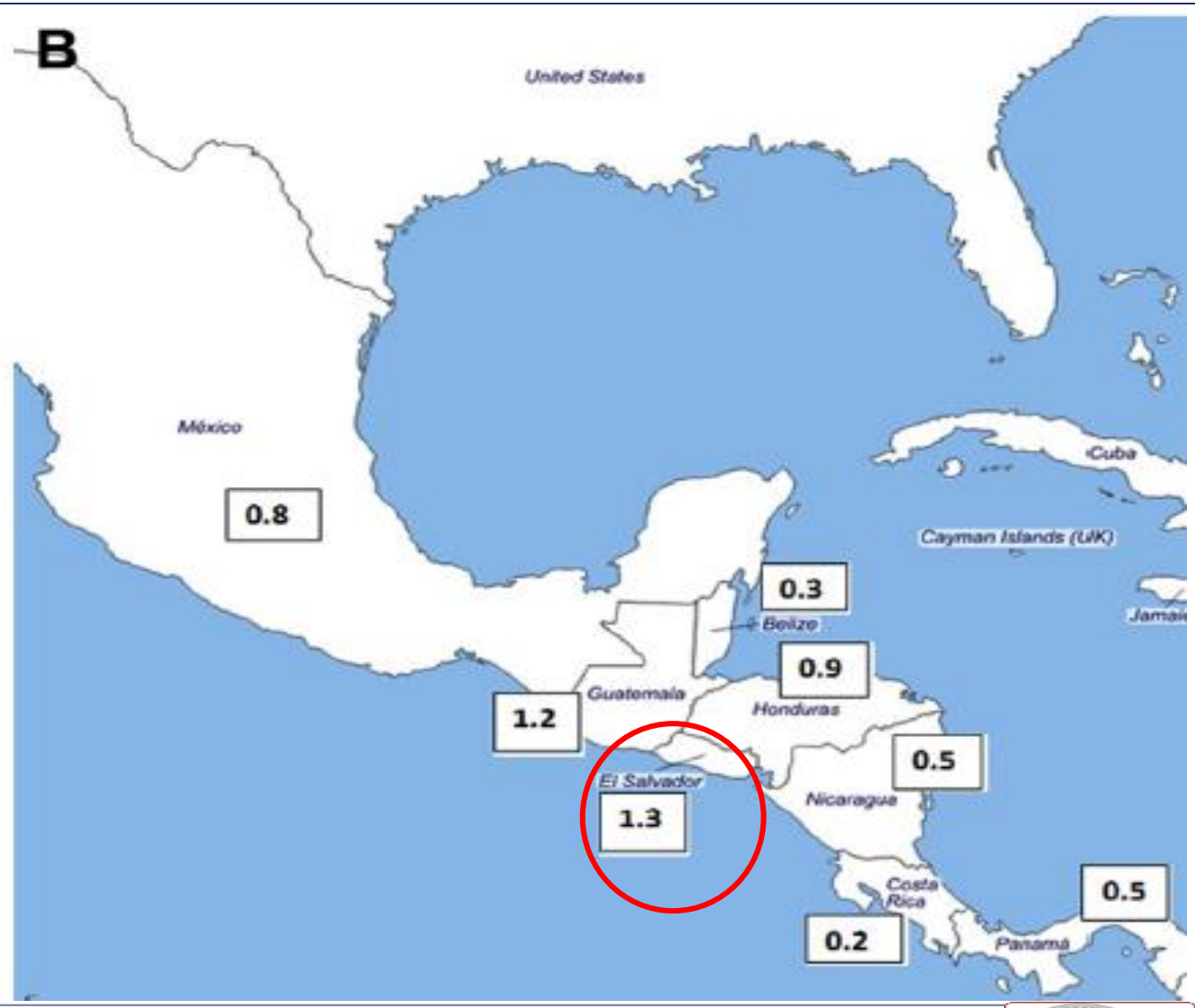
Table 1
Seroprevalence of the five neglected tropical diseases and women to men ratio

Infection	Numerator and denominator	Overall prevalence (95% CI)	Women to men ratio	Geosentinel Regions with highest prevalence		
				Geosentinel region	Numerator and denominator	Region-specific prevalence (95% CI)
Strongyloidiasis	42/939	4.51% (3.35–6.05)	1 : 2	North East Asia	2/31	6.45% (1.48–23.93)
				Sub-Saharan Africa	20/330	6.06% (3.93–9.22)
				South Central Asia	5/90	5.55% (2.29–12.85)
Schistosomiasis	31/519	5.97% (4.22–8.37)	1 : 2.8	Sub-Saharan Africa	25/323	7.73% (5.27–11.22)
				South America	3/46	6.52% (2.02–19.05)
				South Central Asia	1/34	2.94% (0.37–19.77)
Chagas disease	7/180	3.88% (1.85–7.98)	2.5 : 1	South America[a]	7/172	4.06% (1.93–8.34)
Toxocariasis	11/113	9.73% (5.42–16.86)	1 : 1.8	South East Asia	2/6	33.33% (4.18–85.13)
				South America	4/19	21.05% (7.33–47.32)
				Eastern Europe	3/24	6.89% (3.73–34.48)
Filariasis	5/54	9.25% (7.83–11.63)	1 : 1.5	Sub-Saharan Africa[a]	5/34	14.70% (5.96–31.91)

[a] Only one region is reported because the infection was not found in people coming from other areas.

Estimated prevalence of Chagas disease in Central and South America





Gomez-Ochoa SA et al. Global Heart 2022;17(1):59

Global, Regional, and National Trends of Chagas Disease from 1990 to 2019: Comprehensive Analysis of the Global Burden of Disease Study

During the year 2019, the global prevalence of CD was 6,469,283 (95% UI = 5,658,409.78–7,374,556.70), showing a decreasing trend compared to the prevalence reported in 1990. This difference represented a 11.3% decrease in prevalence over the last three decades. Similarly, the age-standardized prevalence rate per 100,000 population in 2019 decreased to 83.61 (95% UI = 73.13–95.31) representing a 42% reduction of this value with respect to 1990 (Supplementary Figure 1). Bolivia remained the country with the highest prevalence rate per 100,000 population (4993.53; 95% UI = 4540.19 – 5483.11), followed by Venezuela (1654,73; 95% UI = 1439.50–1897.81) and Argentina (1524.07; 95% UI = 1343.16 – 1736.00) (Supplementary Figure 2). On the other hand, Brazil remained the country with the higher number of estimated CD cases, with around 2,164,570 cases (33.5% of the total). Furthermore, Argentina was the endemic country with the largest reduction in the prevalence number (–54.68%), followed Chile (–50.95%) and Uruguay (–49.95%), while Mexico (39.58%), Brazil (12.80%) and Honduras

Gomez-Ochoa SA et al. Global Heart 2022;17(1):59

Global, Regional, and National Trends of Chagas Disease from 1990 to 2019: Comprehensive Analysis of the Global Burden of Disease Study

Similar to the prevalence trend, global deaths per 100,000 population due to CD decreased from (0.31; 95% UI = 0.14–0.37) in 1990 to (0.12; 95% UI = 0.07–0.21) in 2019. Furthermore, a 15.6% decrease in the absolute number of deaths was observed in this period (11,235 deaths due to CD estimated in 1990 compared to 9487 in 2019) (Supplementary Figure 3). Brazil was the country with the largest number of deaths due to CD during this period (7903 in 1990 and 6523 in 2019). On the other hand, Bolivia had the largest age-adjusted death rate per 100,000 population both in 1990 (10.93; 95% UI = 2.29–23.49) and in 2019 (7.27; 95% UI = 1.58–17.19) (Supplementary Figure 4).

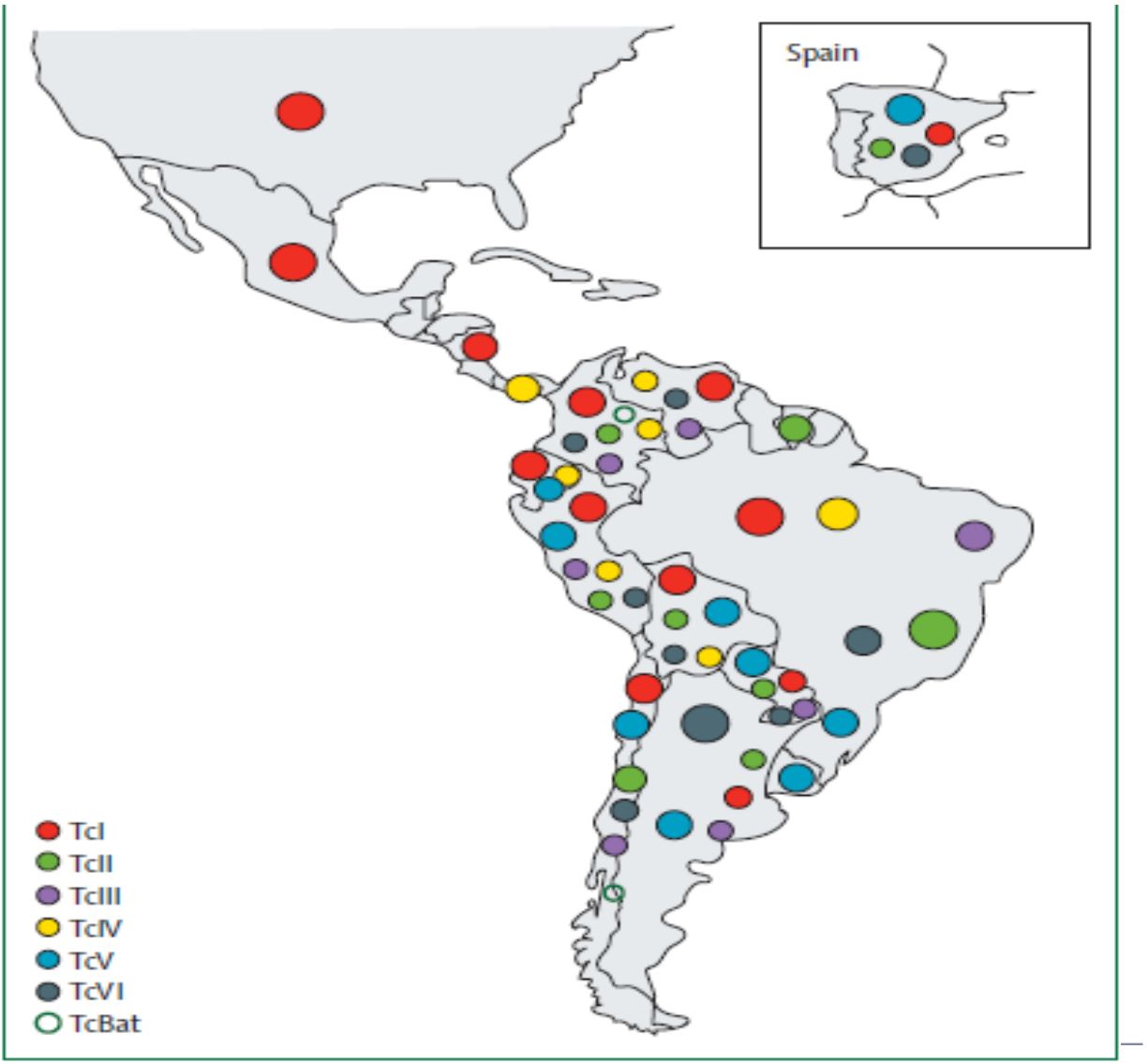
The global disability-adjusted life-years (DALYs) due to CD were 360,872 (95% UI = 153,746–450,827) in 1990 and 275,377 (95% UI = 184,453–459,354) in 2019; representing an important decrease of around 23.7% DALYs over the evaluated period. Likewise, the global

Gomez-Ochoa SA et al. Global Heart 2022;17(1):59

Pathogen diversity, immunity, and the fate of infections: lessons learned from *Trypanosoma cruzi* human–host interactions

Lancet Microbe 2022 3: 711–22

Luísa M D Magalhães, Kenneth J Gollob, Bianca Zingales, Walderez O Dutra



	Geographical distribution	Main cycle	Vectors (genus)
TcI	North America, central America, and South America	Domestic and sylvatic	*Rhodnius, Triatoma, Mepraia, Meccus, Panstrongylus*
TcII	North America and South America	Domestic	*Triatoma, Panstrongylus, Meccus, Rhodnius, Mepraia*
TcIII	North America and South America	Sylvatic	*Triatoma, Panstrongylus, Meccus, Rhodnius*
TcIV	North America, central America, and South America	Domestic	*Rhodnius, Triatoma, Meccus, Panstrongylus*
TcV	North America and South America	Domestic	*Triatoma, Mepraia*
TcVI	South America	Domestic	*Triatoma, Mepraia, Rhodnius*
TcBat	Central America and South America	Sylvatic	*Triatoma, Cavernicola*

Figure 1: **Geographical distribution of Trypanosoma cruzi discrete typing units in humans**

Prevalence of Chagas Disease in Latin-American Migrants Living in Europe: A Systematic Review and Meta-analysis

Ana Requena-Méndez[1]*, Edelweiss Aldasoro[1], Elisa de Lazzari[1], Elisa Sicuri[1], Michael Brown[2], David A. J. Moore[2], Joaquim Gascon[1], Jose Muñoz[1]

Table 4. Pooled *T. cruzi* prevalence by country of origin in Latin American migrants from European countries.

Country	Number screened	Number of seropositives	Country-specific prevalence* (%)	95% CI	Prevalence in country of origin (National level) PAHO (%)[39]	Prevalence ratio
Argentina	875	16	2.2	0.80–4·13	4.13	0.53
Bolivia	2264	541	18	13.9–22.66	6.75	2.67
Brazil	954	4	0.6	0.16–1.12	1.02	0.59
Chile	290	1	1	0.17–2.36	0.99	1.01
Colombia	1627	6	0.5	0.15–0.92	0.96	0.52
Ecuador	2131	7	0.4	0.18–0.72	1.74	0.23
El Salvador	67	2	3.7	1.62–11.7	3.37	1.10
Honduras	136	3	4.2	1.27–7.36	3.05	1.38
Mexico	166	0	1.5^	0.24–3.76	1.03	1.46
Nicaragua	50	1	4.6	0.76–11.3	1.14	4.04
Paraguay	385	19	5.5	3.46–7.91	2.54	2.17
Peru	1029	4	0.6	0.23–1.18	0.69	0.87
Uruguay	248	0	0.8^	0.08–2.24	0.66	1.21
Venezuela	311	0	0.9^	0.16–2.22	1.16	0.78

4.2%

CI: Confidence Interval; PAHO: Pan American Health Organization;

*Weighted prevalence with Random effect model;

^ although there was not any reported case of Chagas disease in migrants coming from this country, the weighted prevalence is not "0" due to the Random Effect model

Plos Neglect Trop Dis 2015;9:e0003540

Chagas disease in Italy

SURVEILLANCE AND OUTBREAK REPORTS

Chagas disease in Italy: breaking an epidemiological silence

A Angheben (andrea.angheben@sacrocuore.it)[1,2], M Anselmi[1,2], F Gobbi[1,2], S Marocco[1], G Monteiro[1], D Buonfrate[1,2], S Tais[3], M Talamo[4], G Zavarise[5], M Strohmeyer[6,2], F Bartalesi[6], A Mantella[6], M Di Tommaso[7], K H Aiello[7], G Veneruso[8], G Graziani[9], M M Ferrari[10], I Spreafico[10], E Bonifacio[11], G Gaiera[12], M Lanzafame[13], M Mascarello[13], G Cancrini[14], P Albajar-Viñas[15], Z Bisoffi[1,2], A Bartoloni[6,2]

residents from Latin American. Among 867 at-risk subjects screened between 1998 and 2010, the Centre for Tropical Diseases in Negrar (Verona) and the Infectious and Tropical Diseases Unit, University of Florence found 4.2% patients with positive serology for Chagas disease (83.4% of them migrants, 13.8% adoptees).

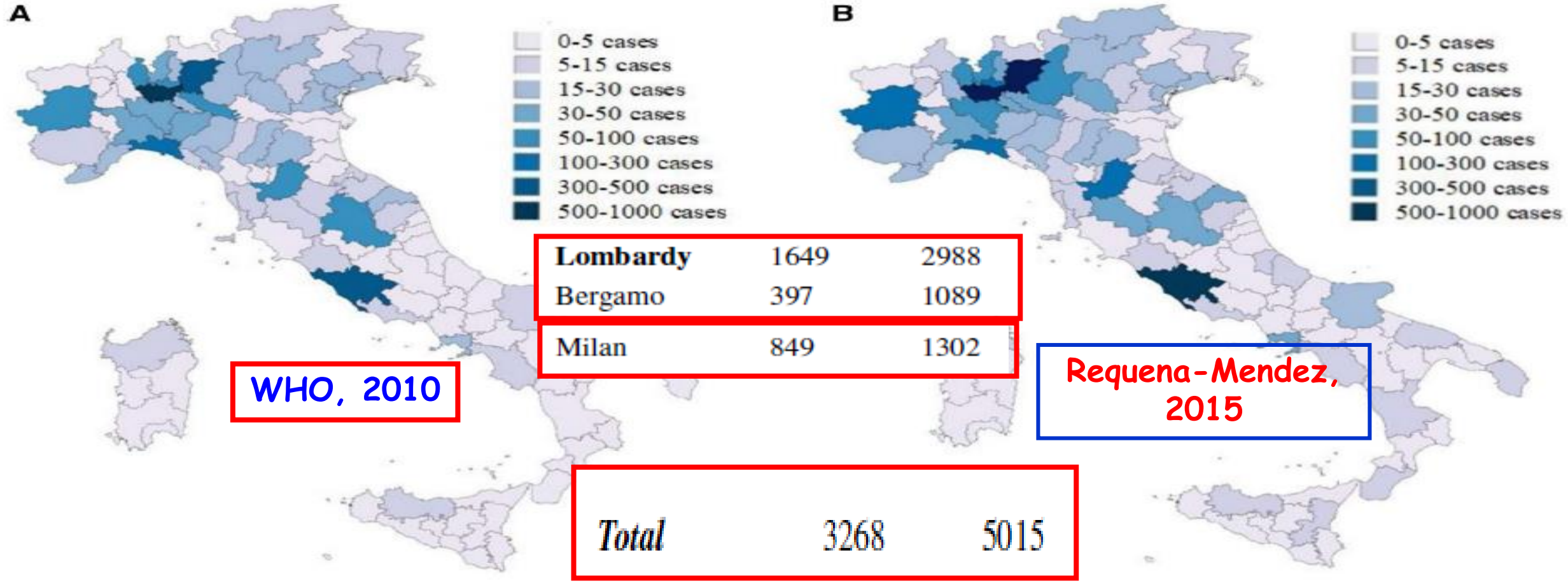
77.7% from Bolivia

	Number of individuals n (% of all 867)	Seropositive patients: n (% of 36 seropositive patients)
Country of origin		
Argentina	17 (2)	2 (5.5)
Bolivia	157 (18)	28 (77.7)
Brazil	255 (29.4)	1 (2.8)
Chile	35 (4)	0 (0)
Colombia	120 (13.8)	0 (0)
Costa Rica	10 (1.2)	0 (0)
Ecuador	17 (2)	1 (2.8)
Guatemala	5 (0.6)	0 (0)
Italy	11 (1.3)	1 (2.8)
Mexico	16 (1.9)	1 (2.8)
Nicaragua	1 (0.1)	0 (0)
Paraguay	3 (0.4)	1 (2.8)
Peru	91 (10.4)	0 (0)
Uruguay	1 (0.1)	0 (0)
Venezuela	12 (1.4)	0 (0)
Unknown[b]	116 (13.4)	1 (2.8)

EuroSurveill 2011;16(37):ppp=19969

Chagas disease in Italy: updated estimates

Irene Campolmi[1] · Andrea Angheben[2] · Filomena Bruna Aliani[3] · Michele Spinicci[1] · Alessandro Bartoloni[1] · Lorenzo Zammarchi[1]



Lombardy	1649	2988
Bergamo	397	1089
Milan	849	1302
Total	3268	5015

WHO, 2010

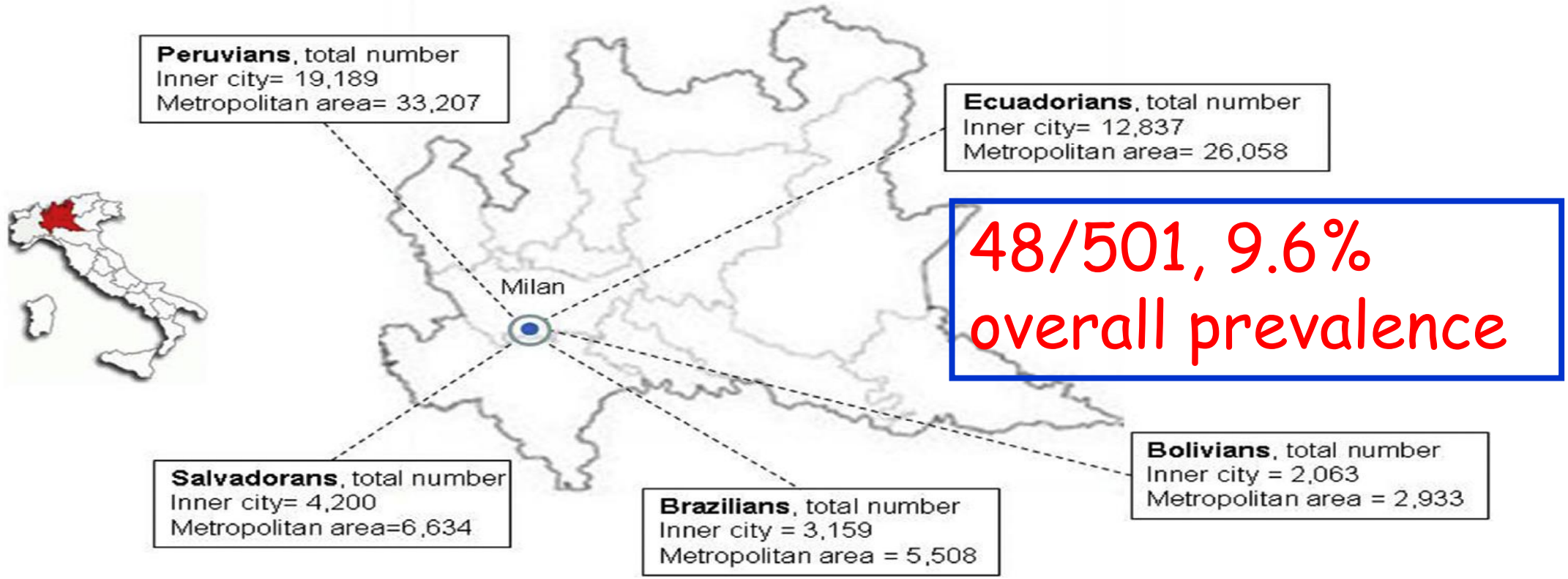
Requena-Mendez, 2015

Internal and Emergency Medicine (2020) 15:1339–1343

Original article

Chagas disease knocks on our door: a cross-sectional study among Latin American immigrants in Milan, Italy

S. Antinori [1, 2, *], L. Galimberti [2], R. Grande [3], R. Bianco [4], L. Oreni [2], L. Traversi [2], D. Ricaboni [2], G. Bestetti [2], A. Lai [1], D. Mileto [3], M.R. Gismondo [3], M. Petullà [4], S. Garelli [6], G. De Maio [6], C. Cogliati [5], D. Torzillo [5], A.M. Villa [7], A.M. Egidi [6], E.C. Repetto [6], A.L. Ridolfo [2], M. Corbellino [2], M. Galli [1, 2]

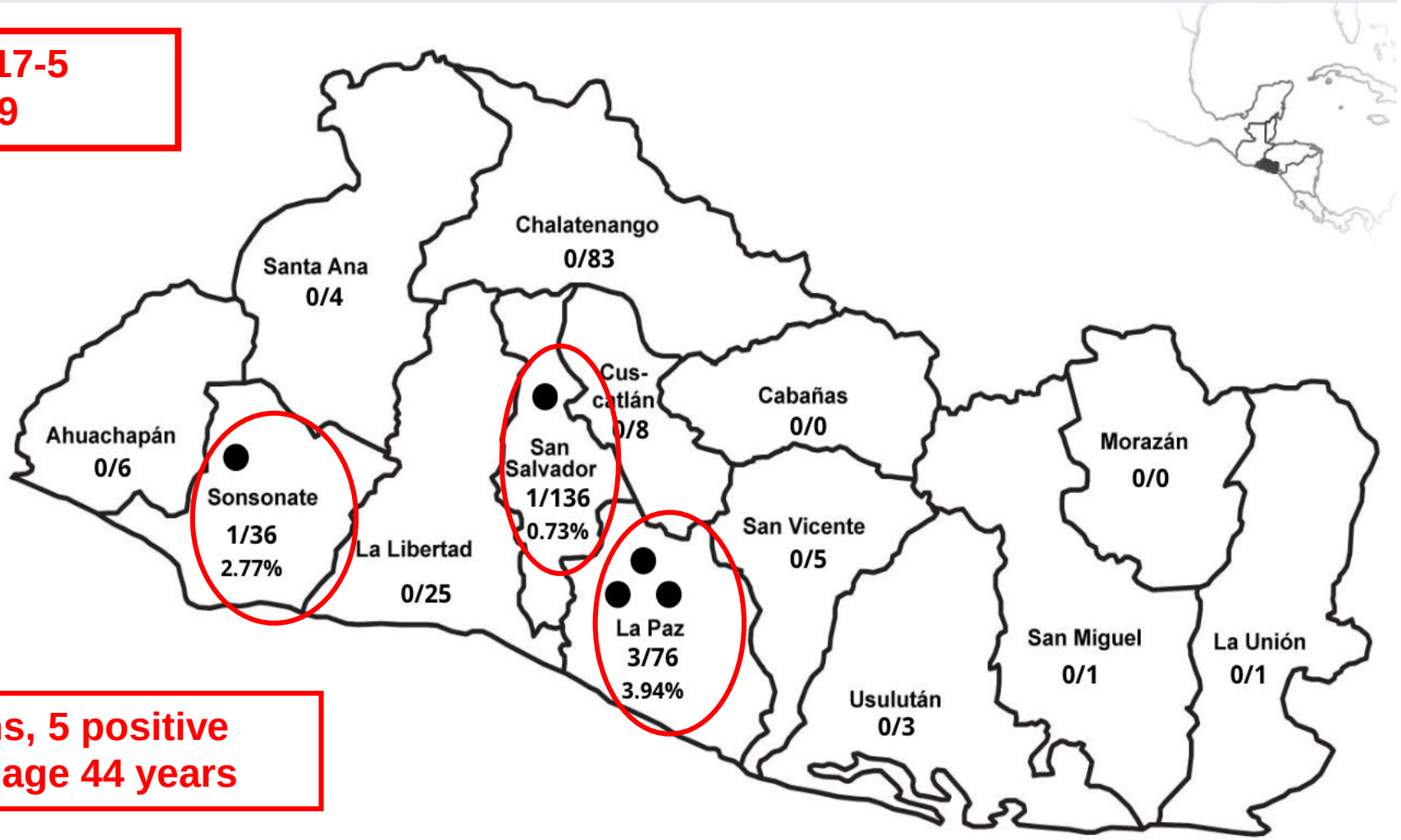


48/501, 9.6%
overall prevalence

Clin Microbiol Infect 2018;24:1340.e1-1340.e6

Chagas disease seroprevalence in immigrants from El Salvador in Milan, Italy: a cross-sectional study

13 October 2017-5 December 2019



384 Salvadorans, 5 positive (1.3%), median age 44 years

Data not published

Screening of at-risk blood donors for Chagas disease in non-endemic countries: Lessons from a 2-year experience in Tuscany, Italy

Valentina D. Mangano[1,2] | Marco Prato[3] | Antonella Marvelli[4] | Giovanna Moscato[5] | Fabrizio Bruschi[1,6]

TABLE 1 Characteristics of blood donors at risk for *Trypanosoma cruzi* infection and of *T. cruzi* seropositive blood donors

Demographic characteristic		*N* donors at risk (%)	*N* seropositive donors (%)	% Seropositivity (
Gender	Female	786 (39.6)	6 (60.0)	0.8 (0.4–1.7)
	Male	1199 (60.4)	4 (40.0)	0.3 (0.1–0.9)
Age group (years)	18–29	361 (18.2)	5 (50.0)	1.4 (0.6–3.2)
	30–39	435 (21.9)	1 (10.0)	0.2 (0.0–1.3)
	40–49	563 (28.4)	3 (30.0)	0.5 (0.2–1.6)
	50–69	439 (22.1)	0 (0.0)	0.0 (0.0–0.9)
	60–71	156 (7.9)	1 (10.0)	0.6 (0.1–3.5)
	Unknown	31 (1.6)	0 (0.0)	0.0 (0.0–11.0)
Continent of birth	Europe	1534 (77.3)	8 (80.0)	0.5 (0.3–1.0)
	Latin America	205 (10.3)	2 (20.0)	1.0 (0.3–3.5)
	Other	19 (1.0)	0 (0.0)	0.0 (0.0–16.8)
	Unknown	227 (11.4)	0 (0.0)	0.0 (0.0–1.7)
Total		1985 (100)	10 (100)	0.5 (0.3–0.9)

Transfusion Medicine 2021;31:63-68

Screening of at-risk blood donors for Chagas disease in non-endemic countries: Lessons from a 2-year experience in Tuscany, Italy

Valentina D. Mangano[1,2] | Marco Prato[3] | Antonella Marvelli[4] | Giovanna Moscato[5] | Fabrizio Bruschi[1,6]

TABLE 2 Results of different serological methods for the detection of *Trypanosoma cruzi* antibodies in ICT-seropositive blood donors

Donor ID	ICT result	CLIA result	CLIA index	ELISA1 result	ELISA1 index	ELISA2 result	ELISA2 index	WB1 result	WB2 result
2716	pos	neg	0.02	neg	0.11	neg	0.02	neg	neg
2190	pos	neg	0.01	neg	0.67	neg	0.04	pos	neg
4190	pos	neg	0.01	...	...	...	...	neg	neg
3189	pos	neg	0.15	neg	0.20	neg	0.05	neg	neg
9472	pos	neg	0.09	neg	0.84	neg	0.05	neg	neg
1180	pos	neg	0.02	...	...	...	...	neg	neg
7190	pos	neg	0.07	neg	0.19	neg	0.06	neg	neg
3971	pos	neg	0.01	neg	0.21	neg	0.01	neg	neg
1597	pos	neg	0.02	neg	0.06	neg	0.20	neg	neg
2993	pos	neg	0.06	neg	0.08	neg	0.08	neg	neg

Transfusion Medicine 2021;31:63-68

BMJ Global Health

Chagas disease among pregnant Latin American women in the United Kingdom: time for action

Cristina Fernandez Turienzo,[1] Carmen Cabeza Brasa,[2] William Newsholme,[3] Jane Sandall,[1] Peter L Chiodini,[2,4] David A J Moore[2,4]

- Chagas disease—caused by infection with parasite *Trypanosoma cruzi* (*T. cruzi*)—is an emerging but still largely unrecognised parasitic disease in the United Kingdom (UK).
- The classic vector-borne route of transmission by infected triatomine bugs only occurs in the endemic areas of Latin America, but less common routes of transmission—organ transplantations, blood transfusions and vertical transmission—have been reported in Europe.
- The UK has implemented health policy measures to control the transmission, including the systematic screening of at-risk blood and organ donations.
- Determining the prevalence of *T. cruzi* infection in Latin American women living in London remains a key priority to inform evidence-based screening policy and practice.

BMJ Glob Health 2017;2:e000478

Targeting mother-to-child transmission of Chagas disease

A new partnership between the Pan American Health Organization and Unitaid seeks to accelerate elimination of vertical transmission of Chagas disease. Sanjeet Bagcchi reports.

On June 30, 2022, the Pan American Health Organization (PAHO) and Unitaid started a 5-year partnership worth US$2·6 million to augment regional and countrywide initiatives to eliminate mother-to-child transmission of Chagas disease.

Chagas disease, discovered in 1909 by Carlos Chagas, a physician from Brazil, is caused by the *Trypanosoma cruzi* parasite, which is primarily transmitted via the triatomine bug vector (so-called kissing bug) but can also be transmitted orally (food-borne transmission), through blood or blood products, and through laboratory accidents and organ transplantation. During pregnancy, *T cruzi* can be transmitted vertically from mother to child.

Chagas disease is mostly observed in rural regions of Latin America, where poverty is high. Every year, vector-borne and mother-to-child transmission lead to several thousand new infections, and at least 5 million people carry the parasite. According to WHO, over 1 million women of

and carries significant importance for the Latin America region, where this neglected disease causes more deaths than any other parasitic disease, including malaria, affecting mostly the poorest and most marginalised communities".

Spinello Antinori (University of Milan, Milan, Italy) said: "Vertical transmission of *Trypanosoma cruzi* occurs at a rate of 3–5% and it is increasingly important as vectorial transmission is reduced or under control in many endemic countries."

As PAHO pointed out in its press statement, combatting Chagas disease is complicated by various factors, such as the parasite's multiple means of transmission, asymptomatic cases, gaps in policy and investments, and inadequacy in effective diagnostic tools.

According to Antoni Soriano-Arandes (Hospital Universitari Vall d'Hebron, Barcelona, Catalonia, Spain) this partnership between PAHO and Unitaid is needed because only about 10% of women know they are infected. "It

progress made in tools to combat Chagas disease can rapidly become a reality for individuals living across Latin America and beyond.

According to the press statement by PAHO, the partnership would use the understanding from another initiative funded by Unitaid, CUIDA Chagas, which seeks to generate test, treat, and care tactics that can be reproduced in various countries and contexts. The collaboration would ascertain the efficacy of the new and shorter treatment choices for chronic Chagas disease and authenticate ways to reduce the time required for diagnosis.

PAHO would contribute technical expertise to assist the countries under the CUIDA Chagas initiative, such as Brazil, Bolivia, and Colombia, said the press statement, adding that the goal is to form better ways to interrupt mother-to-child transmission of Chagas disease and share important learnings and progresses to benefit the whole region.

Elizabeth Livingston (Duke

Lennart Nilsson, TT/ Science Photo Library

For more on the **PAHO–Unitaid partnership** see https://www.paho.org/en/news/30-6-2022-paho-and-unitaid-launch-collaboration-advance-elimination-mother-child-transmission

Bagcchi S, Lancet Infect Dis 2022; 22: 1283

AMERICAN SOCIETY FOR MICROBIOLOGY | Clinical Microbiology Reviews®

Worldwide Control and Management of Chagas Disease in a New Era of Globalization: a Close Look at Congenital *Trypanosoma cruzi* Infection

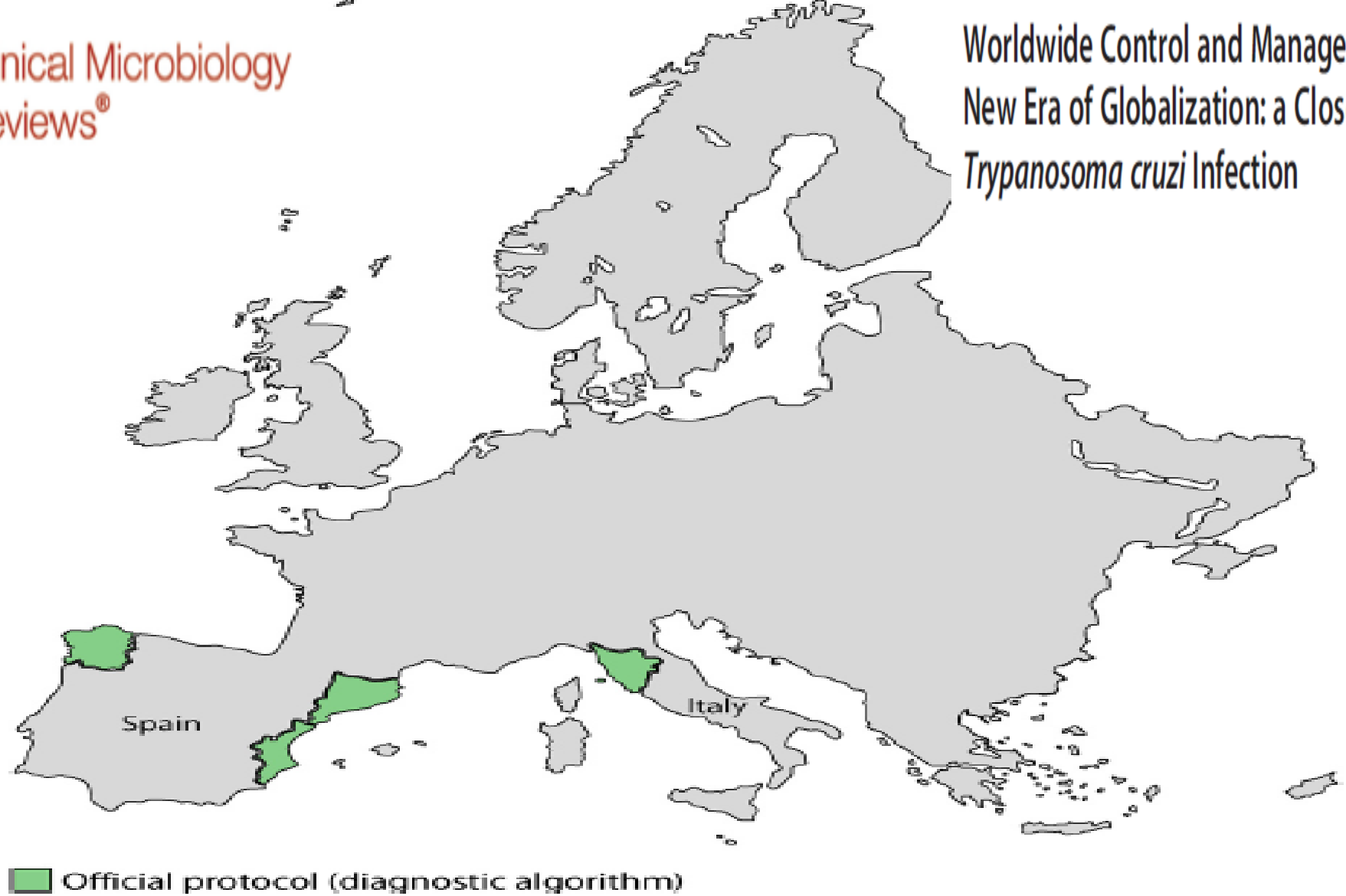
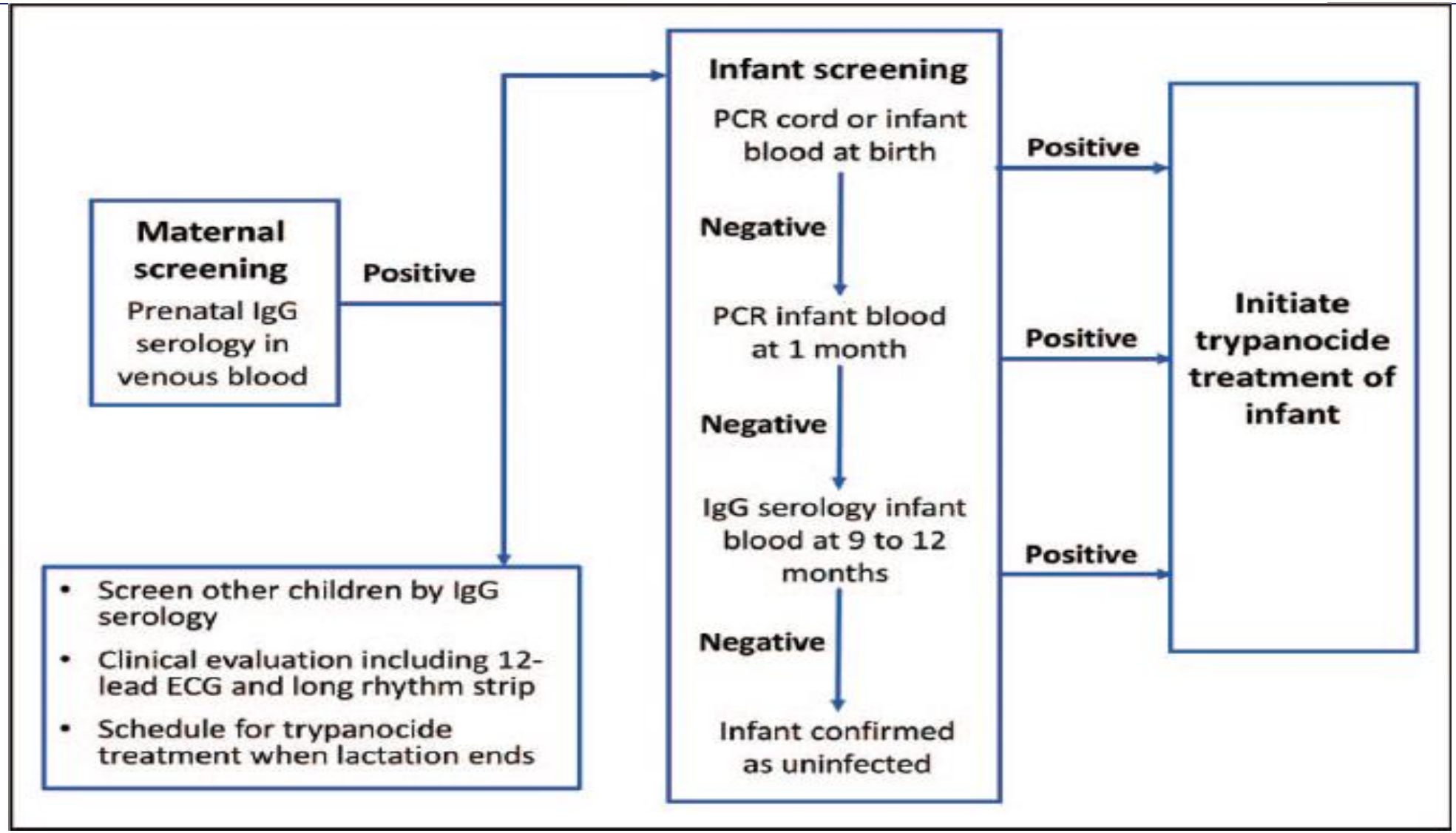


FIG 3 European regions with an official screening protocol including a specific algorithm to diagnose congenital Chagas disease. Diagnostic algorithms are included in Fig. 5.

Abras A et al. Clin Microbiol Rev 2022;35:e00152-21

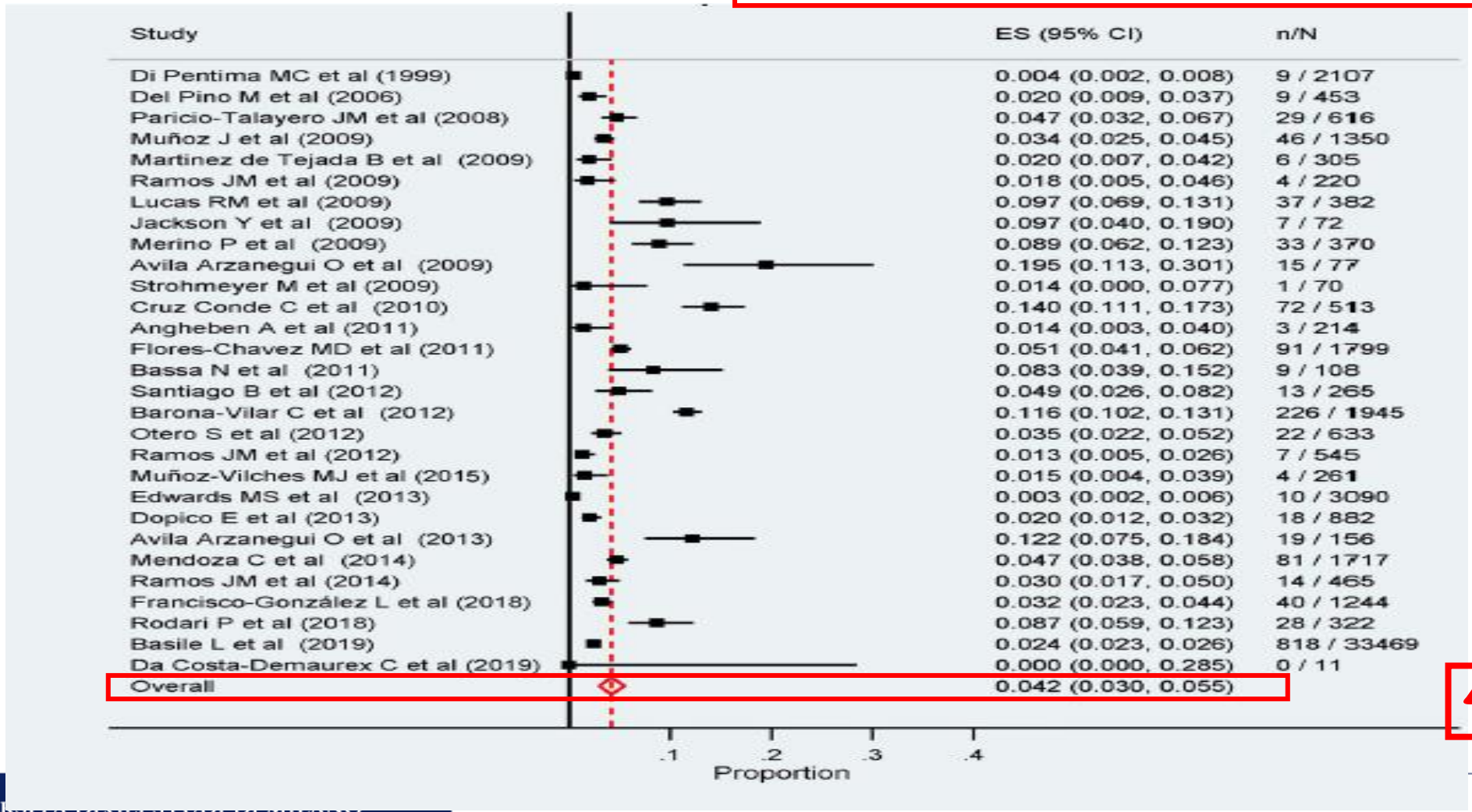
Congenital Chagas disease: current diagnostics, limitations and future perspectives



Messenger LA, Bern C. Curr Opin Infect Dis 2018;31:415-21

Trypanosoma cruzi infection in Latin American pregnant women living outside endemic countries and frequency of congenital transmission: a systematic review and meta-analysis

prevalence of *T. cruzi* in Latin American pregnant women in non-endemic countries

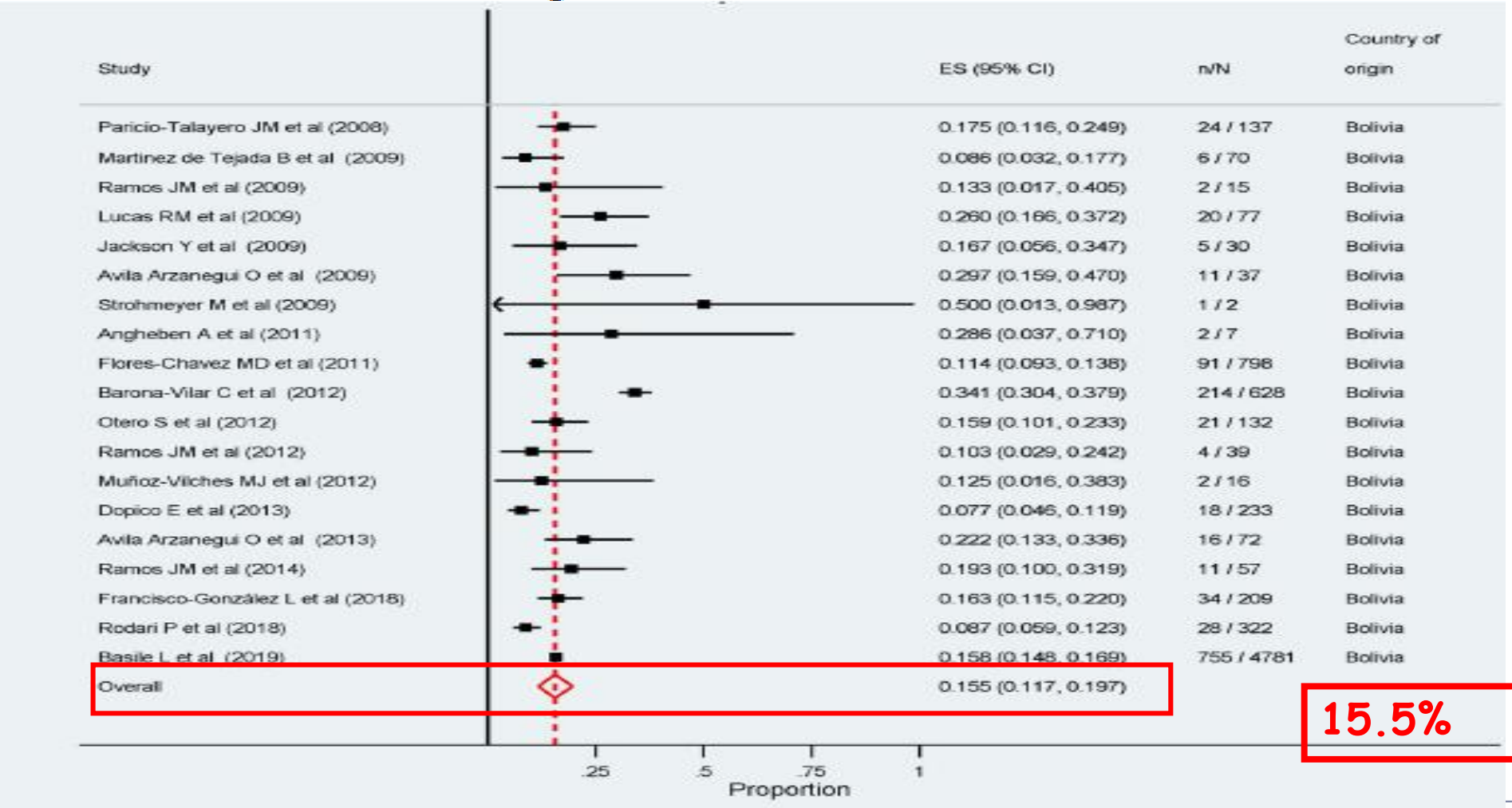


4.2%

Colombo V et al. J Travel Med 2021;28:taaa170

Trypanosoma cruzi infection in Latin American pregnant women living outside endemic countries and frequency of congenital transmission: a systematic review and meta-analysis

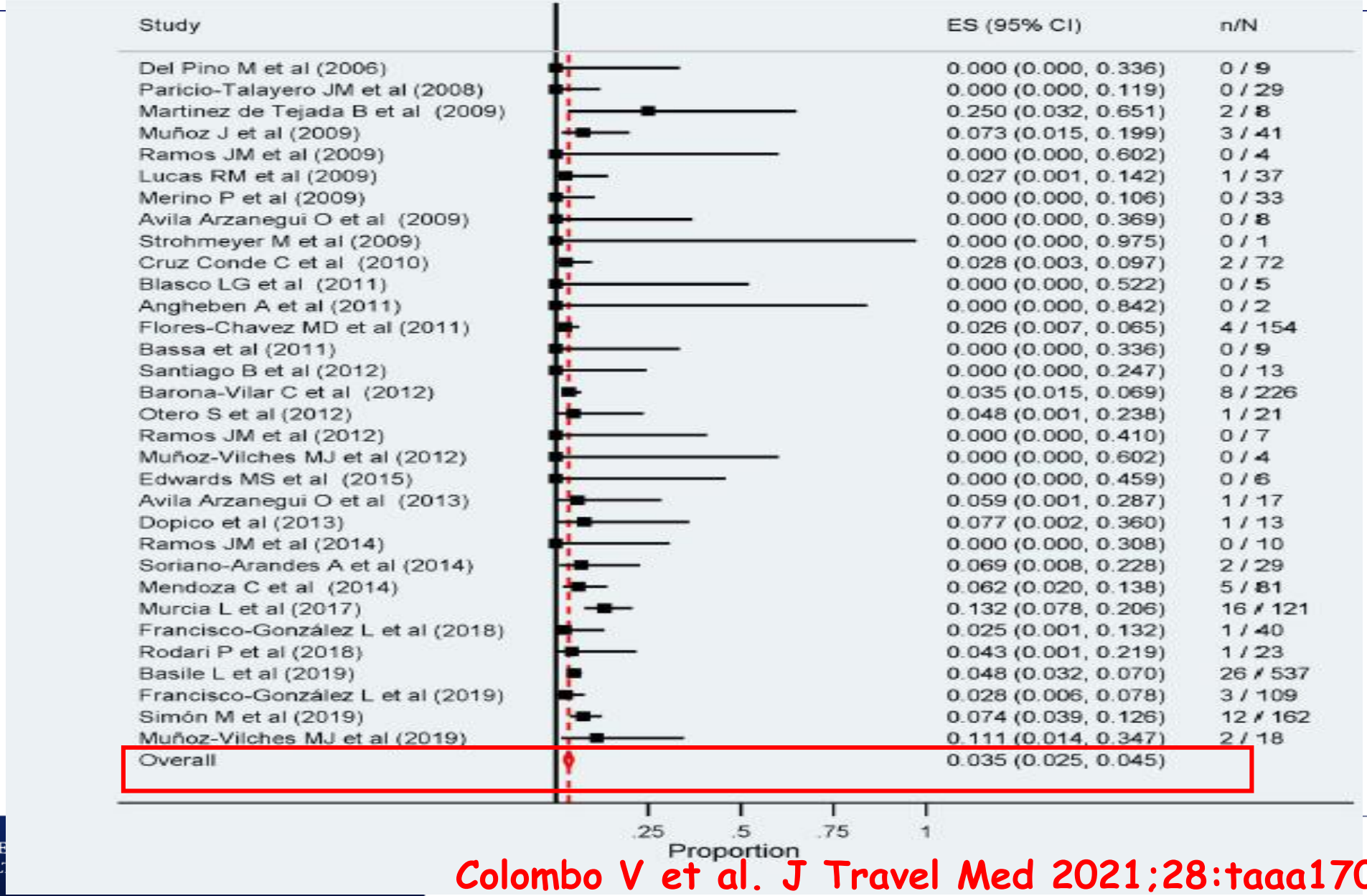
prevalence of *T. cruzi* among Bolivian pregnant women in non-endemic countries



15.5%

Colombo V et al. J Travel Med 2021;28:taaa170

Frequency of congenital transmission of *T. cruzi* in latin American pregnant women in non-endemic countries



3.5%

Colombo V et al. J Travel Med 2021;28:taaa170

Ongoing mother-to-child transmission of Chagas disease in Italy: 2014–18 estimates

Table 1. The number of live births from women citizens continental Latin American c the estimated number of live births from women with CD considering the prevalenc

Citizenship of women from endemic countries delivering live neonates[a]	Number of live births according to mother's citizenship	Estimated numb women with CD
Argentina	615	14 (5-19)
Belize	4	NA
Bolivia	1305	235 (181-296)
Brazil	5383	32 (9-60)
Chile	225	2 (0-5)
Colombia	1325	7 (2-12)
Costa Rica	45	0
Ecuador	6178	25 (11-44)
El Salvador	1471	54 (24-172)
Guatemala	77	1
Guyana	3	NA
Honduras	288	12 (4-21)
Mexico	472	7 (1-18)
Nicaragua	65	3 (0-7)
Panama	46	NA
Paraguay	271	15 (9-21)
Peru	8008	48 (18-94)
Suriname	3	NA
Uruguay	102	1 (0-2)
Venezuela	824	7 (1-18)
All citizenship	26 710	463 (267-792)

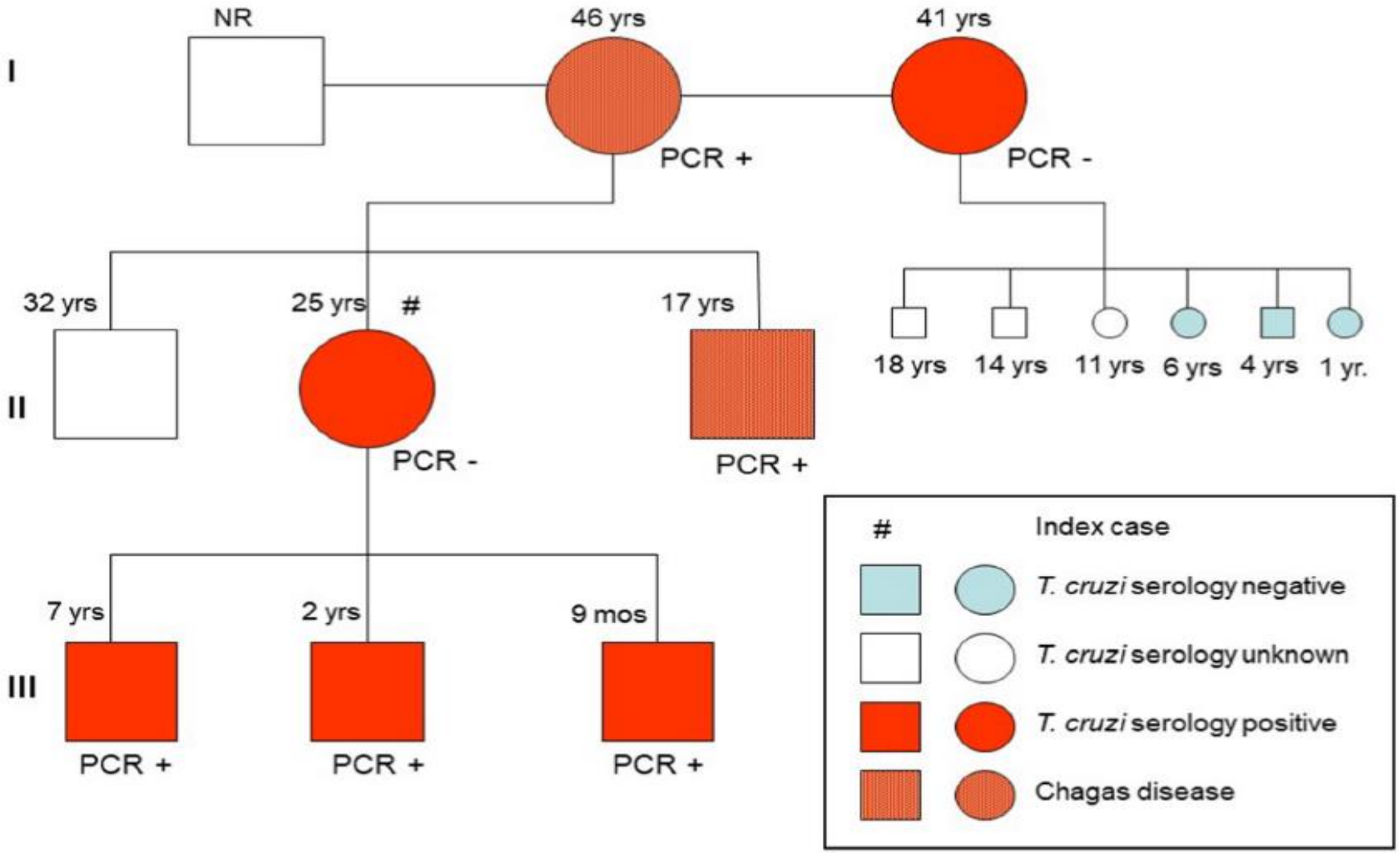
(LAn) women in Italy in the period 2014–18 provided by the National Institute of Statistics of Italy (protocol 00726/2020), the prevalence of CD in LAn migrants living in Europe[5] and the rate of congenital CD transmission provided by Colombo V {3.5% [95% confidence interval (CI):2.5-4.5]}[1], we estimated that 463 live births (95% CI 267-792) have born from women with CD (Table 1), and 16 (95% CI 12-21) congenital infections could have occurred. The prevalence of congenital CD at birth in children born from a LAn mother in Italy can be estimated to be 1:1670.

Zammarchi L et al. J Travel Med 2021; 28:taaa201

Family cluster of Chagas disease among Bolivian immigrants in Italy: High rate of maternal-fetal transmission

Travel Med Infect Dis 2022;49:102370

Spinello Antinori [a,b,*], Laura Galimberti [b], Romualdo Grande [c], Davide Ricaboni [a,b],



Epidemiological and clinical characteristics of the members of the Chagas disease family cluster.

Family member	Age/ Sex	Place of birth and childhood	No. of years in Italy	*T. cruzi* serology	Country and year of CD diagnosis	k-DNA PCR (C121-C122)	Sat-DNA real-time PCR/Ct/par. eq. per mL	*T. cruzi* lineage[a]	ECG/Echocardiography	Digestive involvement
Case 1 (IC)	25 y/ F	Bolivia	7	Positive	Italy, 2014	Negative	Negative	NA	Normal	NA
Case 2 (IC's son)	9 m/ M	Italy	All of life	Positive	Italy, 2016	Positive	Positive/28.88/ 1.12	TcV	Normal	NA
Case 3 (IC's son)	2 y/ M	Italy	All of life	Positive	Italy, 2016	Positive	Positive/29.18/ 0.90	TcV	Normal	NA
Case 4 (IC's mother)	46 y/ F	Bolivia	9	Positive	Bolivia, 2006	Positive	Positive/31.48/ 0.19	NA	Sinus bradycardia; RBBB	Dolichosigma + megacolon
Case 5 (IC's brother)	17 y/ M	Bolivia	7	Positive	Italy, 2016	Positive	Positive/29.78/ 0.60	TcII	Premature atrial complexes/ Mild tricuspid regurgitation	Dolichosigma
Case 6 (IC's son)	7 y/ M	Italy. Five months in Bolivia during first year of life; one year in Dominican Republic (2014)	6	Positive	Italy, 2017	Negative	Positive/32.01/ 0.14	ND	ND	NA
Case 7 (IC's aunt)	41/F	Bolivia	12	Positive	Italy, 2018	ND	Negative	–	Normal	No

Congenital Chagas disease in a non-endemic area: Results from a control programme in Bergamo province, Northern Italy

Paola Rodari[a,b,*], Andrea Angheben[a], Giorgio Gennati[c], Livia Trezzi[c], Graziano Bargiggia[d], Marzia Maino[e], Maurizio Ruggeri[f], Stefania Rampello[g], Laura Soavi[b], Marco Rizzi[b]

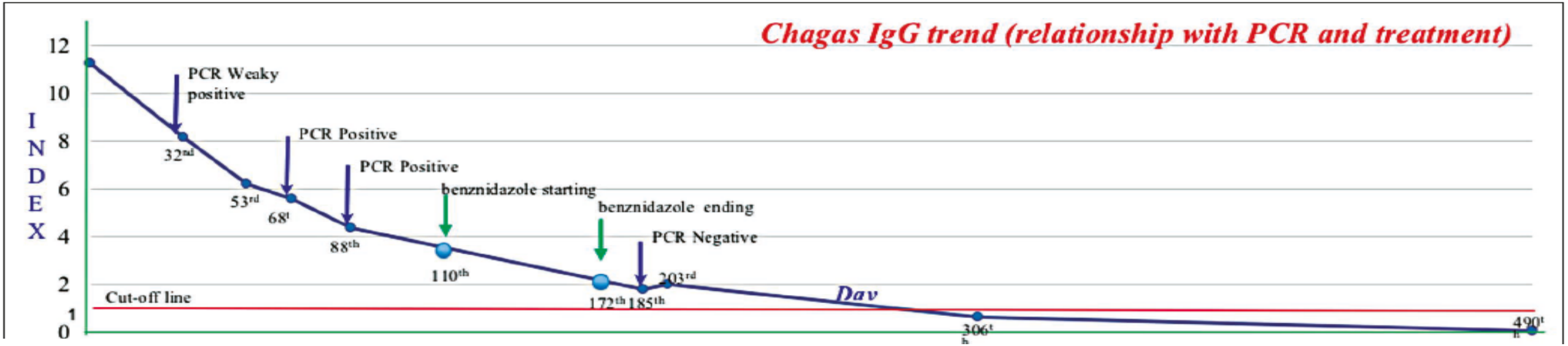
Distribution of deliveries of Bolivian women and screening coverage by hospital in Bergamo province.

Hospital	Number of deliveries (2014–2016)	Pregnant women tested	Coverage %	Positive (%)
Papa Giovanni XXIII - Bergamo	238	222	96.9	24 (10.8)
Eastern area	84	66	80.5	2 (3.0)
North-Eastern area	41	29	70.7	1 (3.4)
Western area	10	3	30.0	1 (33.3)
North-Eastern area	6	0	0	0 (0)
South-Eastern area	4	1	25.0	0 (0)
South-Western area	3	1	33.3	0 (0)
Northern Bergamo	1	0	0	0 (0)
Total	387	322	85.6	28 (8.7)

Travel Med Infect Dis 2018; 25:31-34

Congenital Chagas disease in a Bolivian newborn in Bergamo (Italy)

Graziano Bargiggia[1], Maurizio Ruggeri[2], Gaia Ortalli[1], Simona Gabrielli[3], Paola Rodari[4], Lorenzo D'Antiga[2], Claudio Farina[1]



N.M.R. was born by spontaneous vaginal delivery at 34 week + 4 days (weight 5,99 lbs) on 14th March 2015, from a Bolivian mother. She tested positive to *T. cruzi* serology [index 10.9 (cutoff =1.0)] just before delivery by chemiluminescent microparticle immunoassay (CMIA) from recombinant antigens (Architect Chagas -Abbott Laboratories, Wiesbaden, Germany). The evidence of asymptomatic hypoglycemia and hyperbilirubinemia in the first hours of the child's life, consid-

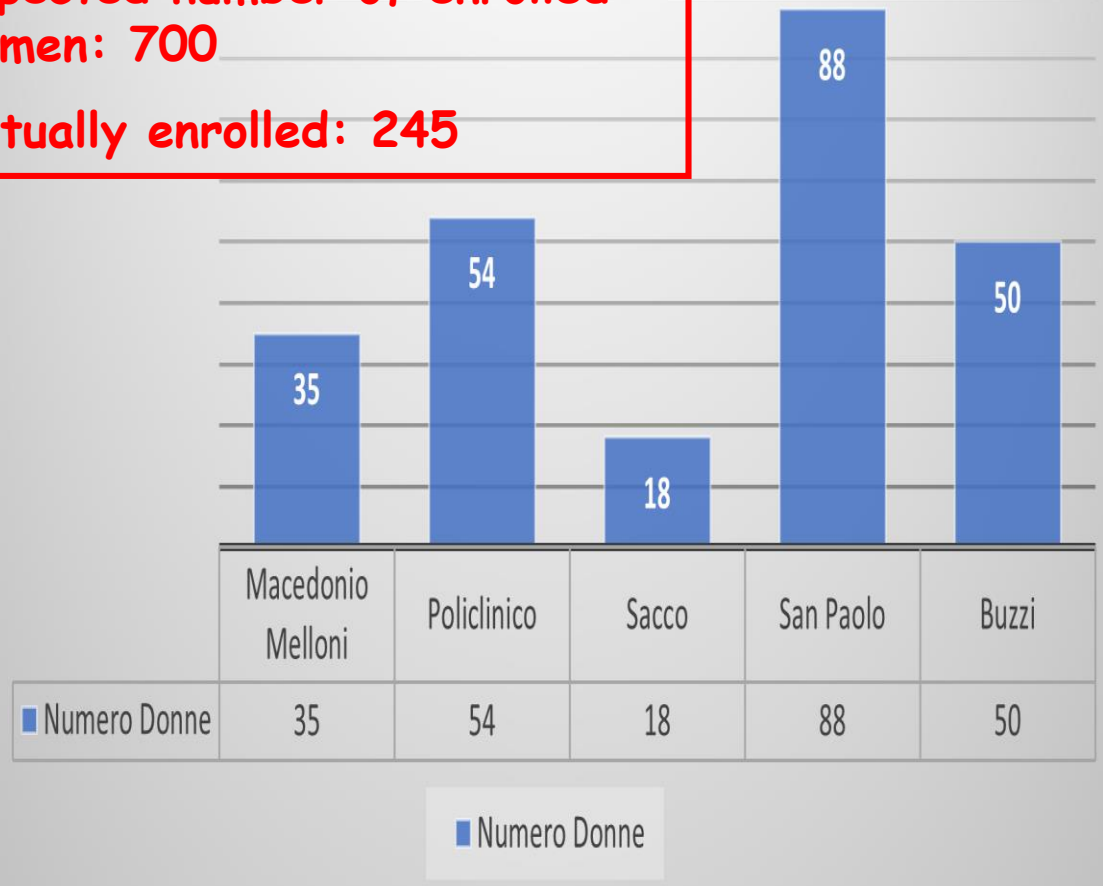
In the first four weeks of life, the baby suffered from frequent episodes of apnoea and hemolytic anemia (lowest haemoglobin level, 76 g/L), but direct Coombs test was negative, as other TORCH complex infections. Finally, he was again hospitalized one month after the birth because of his unclear apnoea and anemia.

Infez Med 2018;1:93-6

Numero di donne afferenti ai diversi centri

Started February 2019;
expected number of enrolled women: 700

Actually enrolled: 245



	Macedonio Melloni	Policlinico	Sacco	San Paolo	Buzzi
Numero Donne	35	54	18	88	50

Data not published

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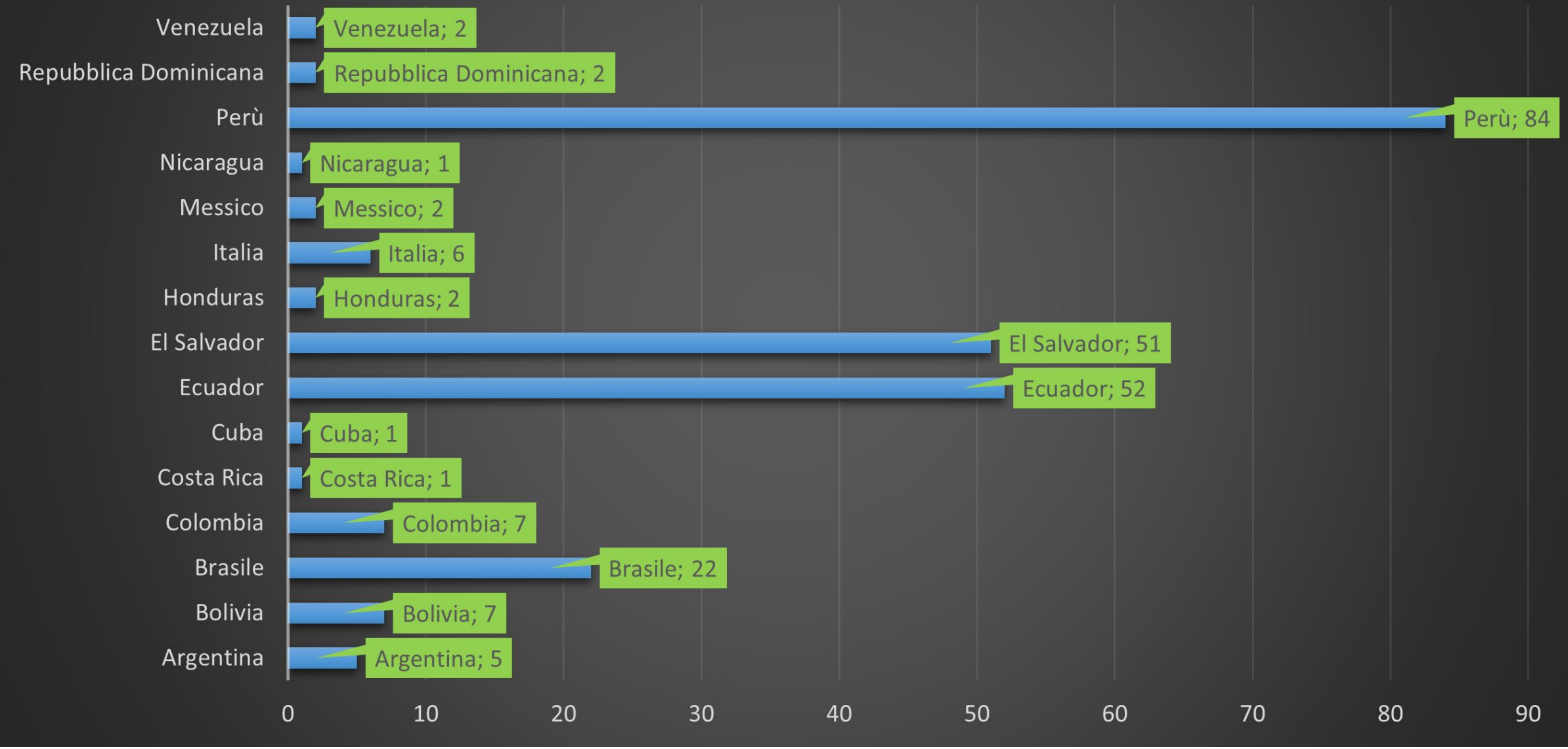
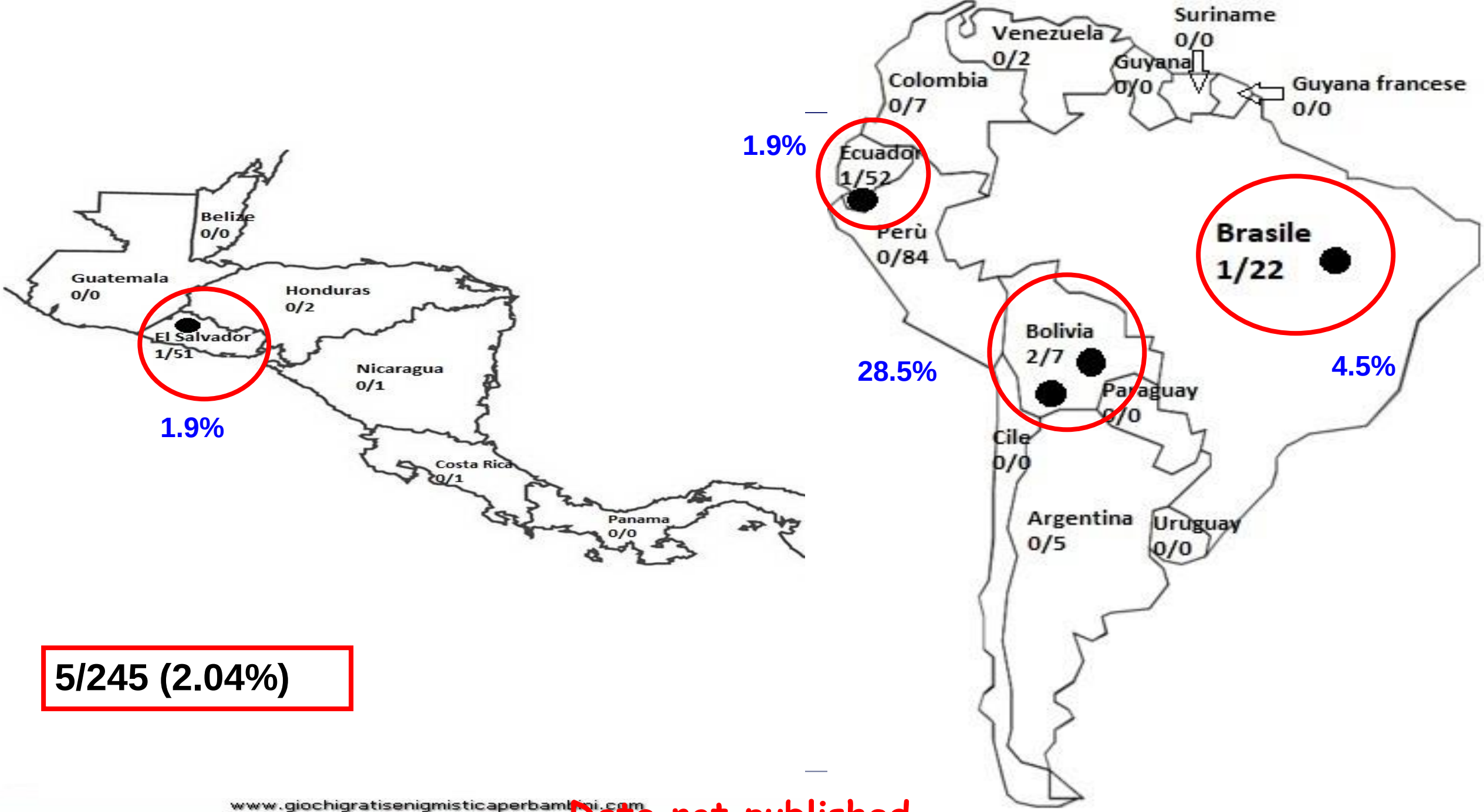


Data not published



5/245 (2.04%)

Data not published

The Clinical and Parasitologic Follow-up of *Trypanosoma cruzi*–infected Children in a Nonendemic Country

Marina Simón, PhD, M. Asunción Iborra, PhD,*† Bartolomé Carrilero, MD, PhD,* María Romay-Barja, PhD,‡ Cristina Vázquez, BS,* Luis J. Gil-Gallardo, BS,* and Manuel Segovia, MD, PhD*†*

TABLE 1. Epidemiologic and Clinical Data of 40 Children With Chagas Disease

Epidemiologic and Clinical Data	Total (%)
Gender	21 (52.5)
Female	19 (47.5)
Male	
Age range (y)*	12 (30.0)
0–1	28 (70.0)
4–14	
Country of origin	20 (50.0)
Bolivia	20 (50.0)
Spain	
Route of transmission	19 (47.5)
Congenital	21 (52.5)
Unknown	
Stage of infection	12 (30)
Acute	9 (75.0)
Acute asymptomatic	3 (25.0)
Acute symptomatic	28 (70.0)
Chronic	18 (64.3)
Chronic indeterminate	4 (14.3)
Chronic cardiac	5 (17.9)
Chronic digestive	1 (3.6)
Chronic cardiac and digestive	

*No children were diagnosed between the ages of 1 and 4 years old.

TABLE 2. Tolerance and Adherence of Benznidazole Treatment Dependent on the Age Range of the Children

	Age			
	0–1	4–14		Total
	N (%)	N (%)	*P*	N (%)
Adherence				
Complete	11 (91.7)	22 (81.5)	0.416	33 (84.6)
Incomplete	1 (8.3)	5 (18.5)		6 (15.4)
Tolerance				
Presence of side effects	0 (0.0)	10 (37.0)	0.014	10 (25.6)
Mild	-	6		6 (15.4)
Moderate	-	2		2 (5.1)
Severe	-	2		2 (5.1)

TABLE 4. Serologic and Parasitologic Evolution of the Disease Over Time

	Children 0–1 y, n/Total (%)	Children 4–14 y, n/Total (%)	*P*
Parasitologic evolution by PCR (N = 38)			
Positive PCR before treatment	12/12 (100)	22/26 (84.6)	0.152
Shift to positive PCR after treatment (treatment failure)	1/12 (8.3)	3/26 (11.5)	0.765
Serologic evolution (N = 34)*			
Cure	10/10 (100)	0/24 (0.0)	0.000
Presence of specific *Trypanosoma cruzi* antibodies after 1–9 y of follow-up	0/10 (0.0)	24/24 (100)	

Pediatr Infect Dis Journal 2020;39:494-99

Pediatric Chagas disease in the non-endemic area of Madrid: A fifteen-year review (2004–2018)

Luz Yadira Bravo-Gallego[1☯], Laura Francisco-González[2☯*], Álvaro Vázquez-Pérez[1], Milagros García-López Hortelano[3], Rogelio López Vélez[4], Luis Ignacio González-Granado[5], Mar Santos[6], Cristina Epalza[7], Ana Belén Jiménez[8], María José Cilleruelo[9], Sara Guillén[10], Tania Fernández[11], Iciar Olabarrieta[12], María Flores-Chavez[13], José Tomás Ramos Amador[14], María Isabel González-Tomé[7]

Table 1. Comparative table regarding age (<1 year-old vs > 1 year-old).

		Children < 1 year-old. N/total (%)	Children ≥1 year-old. N/total (%)	Total
N		16/51 (31,4)	35/51 (68,6)	51
Median age at diagnosis		0.7 months (IQR 0.09–1.54)	11.08 y.o. (IQR 8.14–14.7)	–
Diagnostic procedures		PCR: 15/16 (93,7)	PCR + Serology: 19/35 (54,3)	34/51
		Serology: 1/16 (6,25)	Only Serology: 16/35 (45,7)	17/51
Treatment completed		15/16 (93,7)	33/35 (91,4)	48/51
Treatment drugs	Benznidazole	14/15 (93,3)	25/33 (75,7)	39/48
	Nifurtimox	0/15 (0)	1/33 (3,03)	1/48
	Benznidazole followed by nifurtimox	1/15 (6,6)	7/33 (21,2)	8/48
Treatment adverse events	Benznidazole	5/15 (33,3)	18/32 (78,26)	23/47
	Nifurtimox	0/0(0)	3/9 (33,3)	3/9
Loss to follow-up	Total	6/16 (37,5)	12/35 (34,3)	18/51
	Before treatment	0/16 (0)	2/35 (5,7)	2/51
	During treatment	1/16 (6,2)	0/35 (0)	1/51
	After treatment	5/16 (3,1)	10/35 (28,5)	15/51
Patients who continued follow up	Total	10/16 (62,5)	23/35 (65,7)	33/51
	Cured	8/10 (80)	1/23 (4,3)	9/33
	Decreasing serological titers	1/10 (10)	10/23 (43,4)	11/33
	Serology remains positive	1/10 (10)	12/23 (52,2)	13/33
Born in Spain		16/26 (61,5)	10/35 (28,5)	26/51

Plos Negl Trop Dis 2022; 16:e0010232

Pediatric Chagas disease in the non-endemic area of Madrid: A fifteen-year review (2004–2018)

Luz Yadira Bravo-Gallego[1¶], Laura Francisco-González[2¶*], Álvaro Vázquez-Pérez[1], Milagros García-López Hortelano[3], Rogelio López Vélez[4], Luis Ignacio González-Granado[5], Mar Santos[6], Cristina Epalza[7], Ana Belén Jiménez[8], María José Cilleruelo[9], Sara Guillén[10], Tania Fernández[11], Iciar Olabarrieta[12], María Flores-Chavez[13], José Tomás Ramos Amador[14], María Isabel González-Tomé[7]

33 patients continued the follow-up

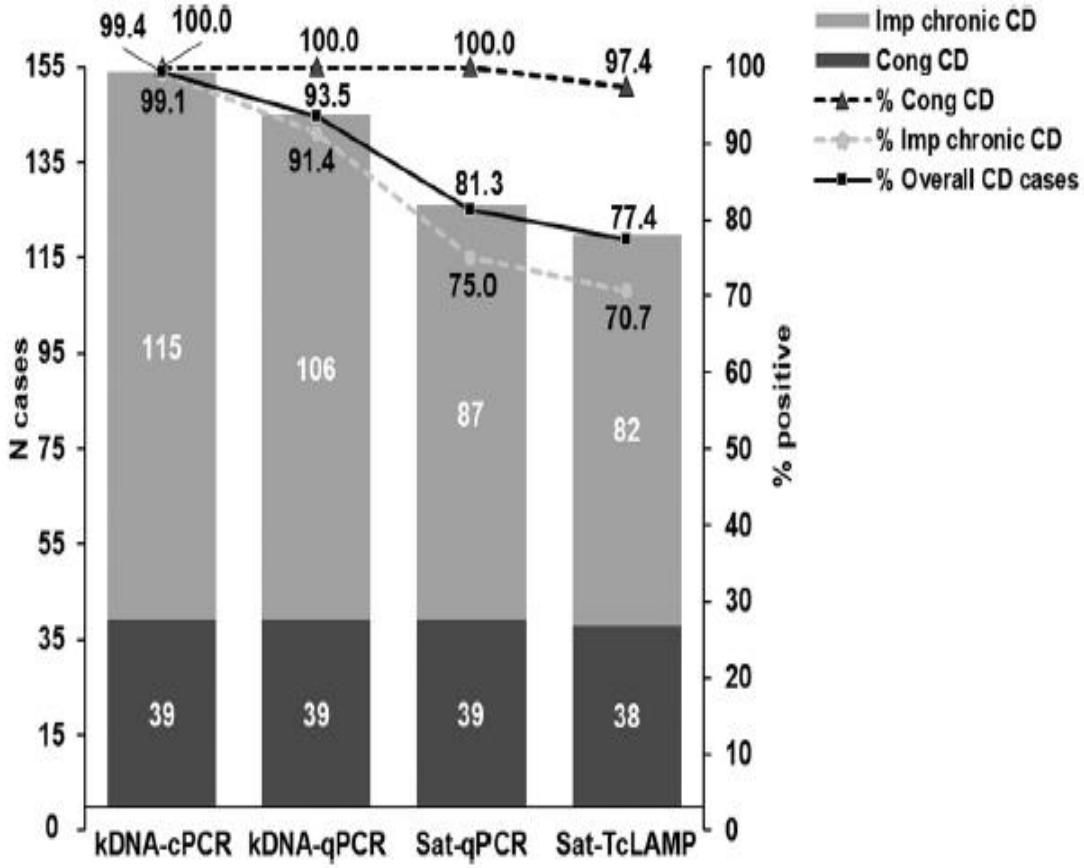
- **9** cured (negativization of serology) (8 <1 y.o at diagnosis, 1 ≥ 1 y.o)
- **11** decreasing serological titers (1 <1 y.o at diagnosis, 10 ≥1 y.o)
- **13** serology remains positive without decreasing titers. (1 <1 y.o at diagnosis, 12 ≥1 y.o)

Cure was confirmed in 80% of the children under one year-old vs 4.3% in those older ($p<0.001$). Loss to follow- up occurred in 35.3% of patients.

Plos Negl Trop Dis 2022; 16:e0010232

Parasitemia Levels in *Trypanosoma cruzi* Infection in Spain, an Area Where the Disease Is Not Endemic: Trends by Different Molecular Approaches

Phase of *T. cruzi* infection	ACUTE	CHRONIC																	
Age	1	2	3	4	5	6	7	8	9	10	11	12	2	3	4	5	< 18	18 to 45	> 46
	Months												Years				Years		
Classification for this study	Congenital CD																Chronic CD		
	Autochthonous CD																Imported chronic CD		
Route of transmission	Mother to child																Unknown		
Country of origin	Spain																endemic areas for CD		
Number of cases	n = 39																n = 116		
	n = 22		n = 7							n = 1			n = 9				n = 6	n = 78	n = 32
Individual cases in follow-up	n = 3																	n = 2	n = 1



Flores-Chavez MD et al. Microbiology Spectrum 2022

Conclusioni

La malattia di Chagas deve essere presa in considerazione nei migranti Latino-americani che vivono nel nostro Paese

E' necessario implementare studi di sieroprevalenza soprattutto nelle aree geografiche con una elevata popolazione migrata dall'America Latina

In particolare va posta attenzione agli *screening* trasfusionali e nelle donne gravide

In queste popolazioni i dati italiani sono molto limitati

Il riconoscimento di un caso di infezione cronica da *T. cruzi* richiede uno screening allargato a tutti i familiari