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Letter to the Editor

Trends in the seroprevalence of antibodies against *Trypanosoma cruzi* among blood donors in a Western Hospital of Venezuela, 2004–2008

Sir,

Trypanosoma cruzi, the causal agent of American tripanosomiasis in humans, is a widely spread protozoan in Latin America. It is endemic in more than 21 countries of the continent (Von et al., 2007; Briceno-Leon, 2009). However, it also occurs in non-endemic countries due to travel and migration, which is associated with an steady increase of foreign residents from Latin America now observed particularly in North America and Europe (e.g. United States of America, Canada, Spain, France and Switzerland, among other countries) (Rodriguez-Morales et al., 2008; Schmunis, 2007; Develoux et al., 2010; Jackson et al., 2010). Chagas disease burden is estimated in 16–18 million infected persons in the world, and over 100 million are considered under risk (Franco-Paredes et al., 2007; Hotez et al., 2008). Chronic infected people are asymptomatic during an indeterminate stage but can represent a significant threat due to blood donations and organ transplantation (Araújo et al., 2008; Castro, 2009). In blood transfusion and organ transplant recipients Chagas disease can manifest with acute disease. Reactivation in this setting of *T. cruzi* infection may produce myocarditis, meningoencephalitis, and dermatologic lesions associated to the use of high dose corticosteroids (Franco-Paredes et al., 2010). Then, *T. cruzi*, as one of the many blood-borne infectious agents, currently represents a significant public health problem, particularly in tropical developing countries, but also in non-endemic countries, because it is transmitted through transfusion of infected blood from individuals that can be even apparently healthy and asymptomatic (Araújo et al., 2008; Kerndt et al., 1991; Reyes et al., 2000).

In the past, blood transfusion was one of the main ways of acquiring the infection, especially in urban areas close to endemic areas where it comes from chronic, asymptomatic cases without serological control (Araújo et al., 2008; Kerndt et al., 1991; Reyes et al., 2000). Currently, multiple strategies to reduce transmission by transfusion have included blood donor selection and deferral, blood donation testing, leukoreduction, filters and pathogen inactivation systems. Blood from infected donors is not used in blood transfusion. Improved blood bank surveillance has contributed to decrease *T. cruzi* blood-donor related transmission (Aché and Matos, 2001). In some countries, e.g. Bolivia, there are high proportions of *T. cruzi* positive individuals among blood donors (Torrico et al., 2006; Rodriguez-Morales et al., 2009). For that reason, the knowledge of infection cases through blood transfusion and the chances for its occurrence imply the needs for the investigation of Chagas disease in blood centers, particularly in highly risky endemic areas and countries, as well when donors came from highly endemic areas (Schmunis, 2007).

Although a significant reduction in Chagas disease during the last decades has been achieved in Venezuela, this country still has endemic areas for *T. cruzi* infection (Aché and Matos, 2001; Añez et al., 2004). Even new ways of transmission, as the oral, have been recently reported in the country, in association with contaminated food with *T. cruzi* infected triatomine feces (Noya et al., 2010). Then, constant surveillance is of utmost importance in this context. Herein we assessed the time trends in the seroprevalence of antibodies against *T. cruzi* among blood donors in a Western Hospital of Venezuela, Hospital Central Antonio María Pineda (Barquisimeto, Lara state), which is a non-endemic location, in a 5-year period, between 2004 and 2008. ELISA serological testing was done with 49,712 donors seen at our blood bank in the study period. Samples that were repeat reactive (RR) with the ELISA underwent supplementary Western-blot confirming testing. For the statistical analyses GraphPad Prism® and SPSS® softwares were used, level of confidence of 95%, p significant <0.05.

During the study period a total of 49,712 blood donors were assessed. The number of blood donors was steady in the period (ranged from 8958 to 11,132/year) with a mean of 9942 donors per year (829 ± 157 donors per month). Of the total of 49,712 blood donors, 368 of them (0.74%, 95%CI 0.67–0.82) were positive for *T. cruzi*, with a seroprevalence along ranging from 0.70% to 0.88% per year (Fig. 1).

An steady seroprevalence along the time was observed ($r^2 = 0.0148$; $p = 0.412$), but ranging from 0.11% to 1.78% per month, determined by seasonality which shown 3 times mean increase in seroprevalence from April (0.36%) to June (1.05%) during the period study years, being more significant in 2007 (0.19–1.73%, 9 times of increase) (Fig. 1). These results indicate that seroprevalence of *T. cruzi* has been stable during the last 5 years, but prevention strategies in the state have not significantly reduced it.

Chagas disease continues to be one the major neglected diseases in developing countries in Latin America where this zoonosis is endemic (Von et al., 2007; Schmunis, 2007; Briceno-Leon, 2009). As has been focused in this study, blood needs to be screened in order to avoid contaminated blood transfusion related transmission due to *T. cruzi* (Aché and Matos, 2001), which herein occurred in 1–18 per 1000 donors per month. This is important not only in Latin America but also in non-endemic countries where Latin American immigrants can be infected (Araújo et al., 2008; Kerndt et al., 1991; Reyes et al., 2000; Rodriguez-Morales et al., 2008; Rodriguez-Morales et al., 2009). Our study, performed in a Venezuelan city around rural endemic areas showed a significant seroprevalence close to 1%, comparable to other studies (Wendel, 1998; Schmunis, 2007).

In Brazil, 1.09% blood bags were discharged in 2004 due to *T. cruzi* in hemotherapy centers (Wendel, 1998). In Peru (1.32%), Chile (1.2%), Colombia (1.2%) and Mexico (1%) similar results have been reported. However, in other countries higher seroprevalence has been also reported, Bolivia (14.79%), Paraguay (4.5%)

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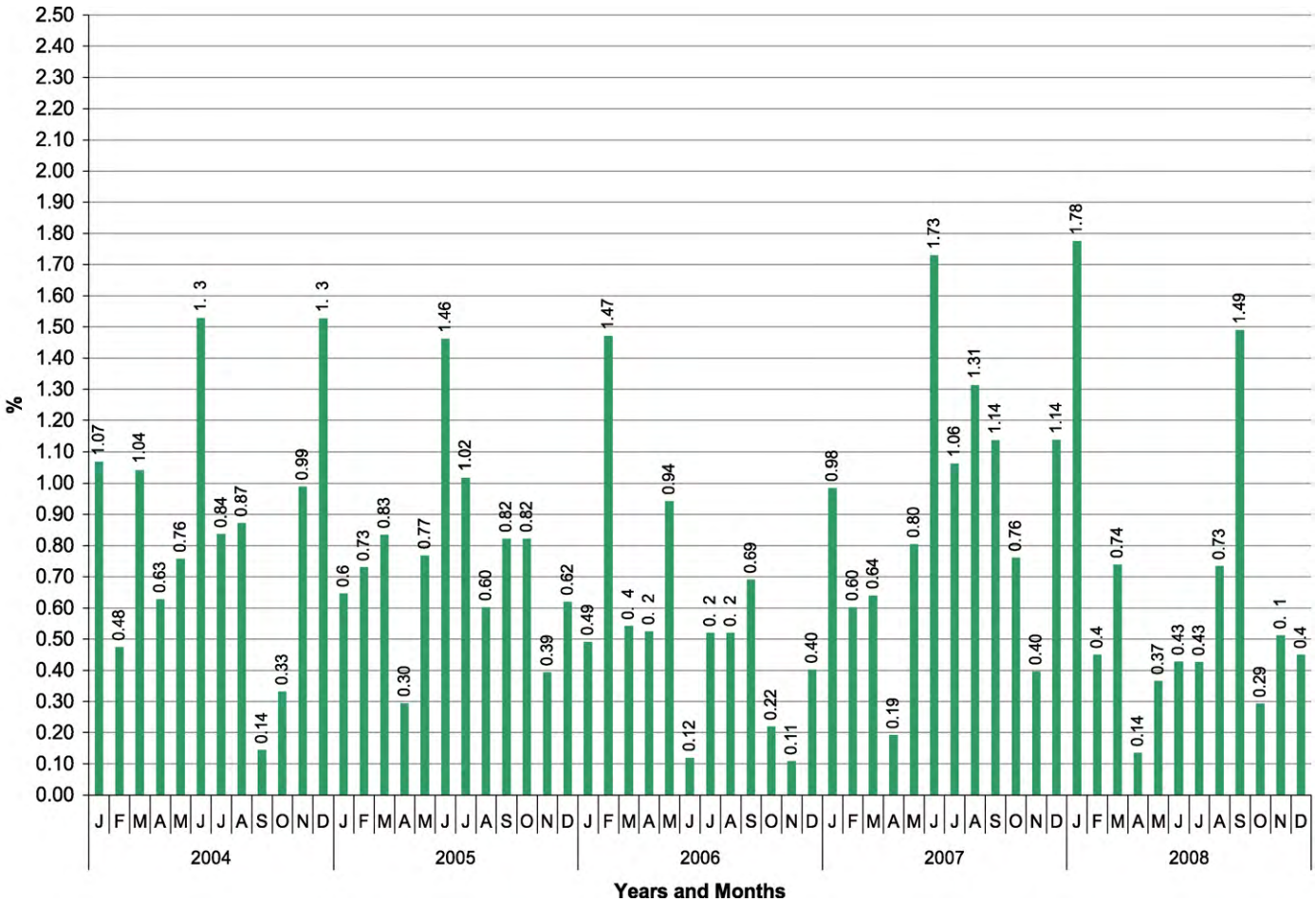

Fig. 1. Monthly *Trypanosoma cruzi* infection seroprevalence in the Hospital Central Antonio María Pineda, Barquisimeto, Venezuela, 2004–2008.

(Araújo et al., 2008; Kerndt et al., 1991; Schmunis, 2007). Compared to our results, in Venezuela higher seroprevalences have been reported, 8.5% in a Caracas reference center (Díaz-Bello et al., 2008). For all these reasons Chagas disease surveillance in endemic and non-endemic countries with Latin American immigrants should be priority in order to prevent and decrease the *T. cruzi* transfusion related infections and consequently acute and chronic related disease (Rodriguez-Morales et al., 2008; Hotez et al., 2008).

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References

Aché, A., Matos, A., 2001. Interrupting Chagas disease transmission in Venezuela. Rev. Inst. Med. Trop. S. Paulo 43, 37–43.

Añez, N., Crisante, G., Rojas, A., 2004. Update on Chagas disease in Venezuela—a review. Mem. Inst. Oswaldo Cruz 99, 781–787.

Araújo, A.B., Vianna, E.E., Berne, M.E., 2008. Anti-*Trypanosoma cruzi* antibody detection in blood donors in the Southern Brazil. Braz. J. Infect. Dis. 12, 480–482.

Briceno-Leon, R., 2009. Chagas disease in the Americas: an ecohealth perspective. Cad. Saude Publica 25 (Suppl. 1), S71–S82.

Castro, E., 2009. Chagas' disease: lessons from routine donation testing. Transfus. Med. 19, 16–23.

Develoux, M., Lescure, F.X., Jaureguiberry, S., Jeannel, D., Elghouzzi, M.H., Gay, F., Paris, L., Le Loup, G., Danis, M., Pialoux, G., 2010. Emergence of Chagas' disease in Europe: description of the first cases observed in Latin American immigrants in mainland France. Med Trop. 70, 38–42.

Díaz-Bello, Z., Zavala-Jaspe, R., Díaz-Villalobos, M., Mauriello, L., Maekelt, A., de Noya, B.A., 2008. A confirmatory diagnosis of antibodies anti-*Trypanosoma cruzi* in donors referred by blood banks in Venezuela. Invest. Clin. 49, 141–150.

Franco-Paredes, C., Von, A., Hidron, A., Rodriguez-Morales, A.J., Tellez, I., Barragan, M., Jones, D., Naquira, C.G., Mendez, J., 2007. Chagas disease: an impediment in achieving the Millennium Development Goals in Latin America. BMC Int. Health Hum. Rights 7, 7.

Franco-Paredes, C., Jacob, J.T., Hidron, A., Rodriguez-Morales, A.J., Kuhar, D., Caliendo, A.M., 2010. Transplantation and tropical infectious diseases. Int. J. Infect. Dis. 14, e189–e196.

Hotez, P.J., Bottazzi, M.E., Franco-Paredes, C., Ault, S.K., Periago, M.R., 2008. The neglected tropical diseases of Latin America and the Caribbean: a review of disease burden and distribution and a roadmap for control and elimination. PLoS Negl. Trop. Dis. 2, e300.

Jackson, Y., Gétaz, L., Wolff, H., Holst, M., Mauris, A., Tardin, A., Sztajzel, J., Besse, V., Loutan, L., Gaspoz, J.M., Jannin, J., Albajar Vinas, P., Luquetti, A., Chappuis, F., 2010. Prevalence, clinical staging and risk for blood-borne transmission of Chagas disease among Latin American migrants in Geneva, Switzerland. PLoS Negl. Trop. Dis. 4, e592.

Noya, B.A., Diaz-Bello, Z., Colmenares, C., Ruiz-Guevara, R., Mauriello, L., Zavala-Jaspe, R., Suarez, J.A., Abate, T., Naranjo, L., Paiva, M., Rivas, L., Castro, J., Marques, J., Mendoza, I., Acquatella, H., Torres, J., Noya, O., 2010. Large urban outbreak of orally acquired acute Chagas disease at a school in Caracas, Venezuela. J. Infect. Dis. 501, 1308–1315.

Kerndt, P.R., Waskin, H.A., Kirchoff, L.V., Steurer, F., Waterman, S.H., Nelson, J.M., Gellert, G.A., Shulman, I.A., 1991. Prevalence of antibody to *Trypanosoma cruzi* among blood donors in Los Angeles, California. Transfusion 31, 814–818.

Reyes, P.A., Monteon, V.M., Hernandez-Becerril, N., 2000. The risk of transfusion transmission of Chagas disease in Mexico City. Transfusion 40, 613.

Rodriguez-Morales, A.J., Benitez, J.A., Tellez, I., Franco-Paredes, C., 2008. Chagas disease screening among Latin American immigrants in non-endemic settings. Travel Med. Infect. Dis. 6, 162–163.

Rodriguez-Morales, A.J., Silvestre, J., Cazorla-Perfetti, D.J., 2009. Chagas disease in Barcelona, Spain. Acta Trop. 112, 86–87.

Schmunis, G.A., 2007. Epidemiology of Chagas disease in non-endemic countries: the role of international migration. Mem. Inst. Oswaldo Cruz 102 (Suppl. 1), 75–85.
Torrico, F., Vega, C.A., Suarez, E., Tellez, T., Brutus, L., Rodriguez, P., Torrico, M.C., Schneider, D., Truyens, C., Carlier, Y., 2006. Are maternal re-infections with *Trypanosoma cruzi* associated with higher morbidity and mortality of congenital Chagas disease? Trop. Med. Int. Health 11, 628–635.
Von, A., Zaragoza, E., Jones, D., Rodríguez-Morales, A.J., Franco-Paredes, C., 2007. New insights into Chagas Disease: a neglected disease in Latin America. J. Infect. Dev. Countries 1, 99–111.
Wendel, S., 1998. Transfusion-transmitted Chagas' disease. Curr. Opin. Hematol. 5, 406–411.

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