Renal Replacement Therapy in CKD: an update from the Latin American Registry of Dialysis and Transplantation

INTRODUCTION

Latin America (LA) is the region of the Americas stretching from Mexico and the Caribbean Islands to Argentina and Chile in the South. The common features of countries in the region are that they share common languages (Spanish and Portuguese) and have a large ethnic diversity. The region's populations are made up from an ethnic fusion process in which the original immigrants from Spain and Portugal were mixed with Europeans, especially during the World Wars, Native Americans (mainly in Bolivia, Guatemala, Peru and Mexico) and the descendants of African slaves (especially in Brazil, Colombia and Uruguay). The mixture of races is so large (for example, in Brazil) that genetic studies have concluded that it is not possible to identify one race according to skin color. Most of these people are usually mulatto and paternal genes come from the Spanish or Portuguese peoples.[1,2]

The region has undergone a rapid process of demographic and epidemiological transition, characterized by reduced birth and mortality rates, concurrent with rapid changes in lifestyle. This came together with the population movement from rural areas to the cities, causing an increase in "non-transmissible" diseases, coexisting with infectious diseases such as dengue and Chagas disease. From the socioeconomic point of view, significant improvements have occurred in the past 10 years, such as the increase in per capita income from US$ 3,683 in 2001 to US$ 7,821 in 2010, and the increase in life expectancy at birth, from 71.6 in 2000 to 74 in 2010.[3-5]

The Latin American Dialysis and Renal Transplantation Registry (RLDTR) began operations in 1991, collecting data from 20 countries - members of the Latin American Society of Nephrology and Hypertension (SLANH) and publishing successive reports since 1993.[6-11] This report, published in its entirety recently,[12] brings the latest results from the year 2010.

The detailed methodology was described in previous reports.[6-11] Participating countries fill out an annual report form concerning the incidence and prevalence of chronic kidney disease (CKD), specifically in stage 5 - those in renal replacement therapy (RRT) under hemodialysis (HD), peritoneal dialysis (PD) and kidney transplantation (Tx). It also includes information on the number of dialysis and transplantation centers. Based on these data, they establish the incidence and prevalence rates as of December 31 of each year, expressed as patients per million of the population (pmp). Then, they compare incidence and prevalence rates with those from previous years and analyze treatment modalities with special emphasis on HD *vs.* PD and functioning renal transplant (Tx).

This report involved 20 countries with a population representing 99% of that in Latin America. Table 1 describes the most important variables analyzed. RRT prevalence in LA increased from 119 patients per million of the population (pmp) in 1991 to 660 pmp in 2010 (HD 392 pmp, pmp PP 129 and Tx 105 pmp) (Figure 1). The highest rates were reported by Puerto Rico (1355 pmp); Argentina, Mexico, Uruguay and Chile, with rates between 777 and 1,136 pmp, respectively.

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Correspondence to:
Roberto Pecoits-Filho.
Pontifical Catholic University of Paraná.
Rua Imaculada Conceição, nº 1155. Curitiba, PR, Brazil.
CEP: 80220-071.
E-mail: r.pecoits@pucpr.br
Tel: +55 41 3271-16757.

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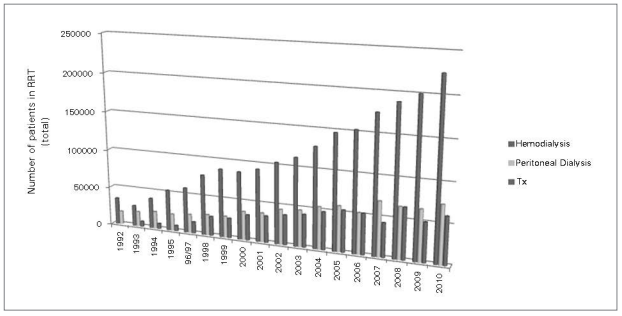
Table 1 Demographic data and general characteristics of the population analyzed in the RLADT

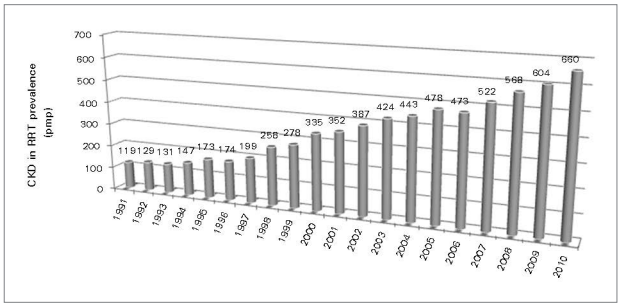
Country	*Population in millions	GDP	**Life expectancy at birthr	Total number of patients in RRT	Number of patients in HD	Number of patients in PD	% of patients in PD	Number of patients with functioning transplant	HD prevalence rate pmp	PD prevalence rate pmp	Dialysis prevalence rate (HD + PD) pmp	Tx prevalence rate pmp	RRT prevalence rate pmp
Argentina *	40370000	9740	76	31399.0	24879	1100	4.2	5420	616.3	27.2	643.5	134.3	777.8
Bolivia	9995000	2040	66	1530.0	1025	175	14.6	330	103.9	17.7	121.7	33.0	153.1
Brazil	195153000	9540	73	117042.0	87661	3653	4.0	25728	449.2	18.7	467.9	131.8	599.7
Chile	17149000	10750	79	19493.0	15462	671	4.2	3360	901.6	39.1	940.8	195.9	1136.7
Colombia *	46448000	5520	73	24760.0	14238	6481	31.3	4041	306.5	139.5	446.1	87.0	533.1
Costa Rica	4669000	6860	79	1582.0	136	97	41.6	1349	29.1	20.8	49.9	288.9	338.8
Cuba	11298000	5460	79	3434.0	2515	115	4.4	804	222.6	10.2	232.8	71.2	303.9
Ecuador	14490000	3850	75	5882.0	5100	500	8.9	282	352.0	34.5	386.5	19.5	405.9
El Salvador	6218000	3370	72	3497.0	1001	2084	67.6	412	161.0	335.2	496.1	66.3	562.4
Guatemala	14334000	2740	71	1767.0	1102	252	18.6	413	76.9	17.6	94.5	28.8	123.3
Honduras	7619000	1870	73	1426.0	1273	124	8.9	29	167.1	16.3	183.4	3.8	187.2
México	112364000	8930	77	109546.0	42915	54496	55.9	12135	381.9	485.0	866.9	108.0	974.9
Nicaragua	5813000	1100	74	215.0	170	15	8.1	30	29.2	2.6	31.8	5.2	37.0
Panamá	3474000	7010	76	1797.0	1181	336	22.1	280	340.0	96.7	436.7	80.6	517.3
Paraguay	6458000	2730	72	960.0	815	10	1.2	135	126.2	1.5	127.7	20.9	148.7
Peru	29272000	4900	74	9814.0	6754	1144	14.5	1916	230.7	39.1	269.8	65.5	335.3
Puerto Rico	3998000	15500	79	5418.0	4384	342	7.2	692	1096.5	85.5	1182.1	173.1	1355.2
Dominican Rep.	9907000	5020	73	1635.0	1262	88	6.5	285	127.4	8.9	136.3	28.8	165.0
Uruguay	3373000	10290	76	3478.0	2265	249	9.9	964	671.5	73.8	745.3	285.8	1031.1
Venezuela	31267000	11660	74	14303.0	10626	1829	14.7	1848	339.8	58.5	398.3	59.1	457.4
Total	573669000	7821	74	358978	224764	73761	25	60453	391.8	128.6	520.4	105.4	625.8

Figure 1. Latin American prevalence of Renal Replacement Therapy (all modes - Latin American Dialysis and Transplant Register 1991-2010).



Although there was an increase in all RRT modalities, HD increased proportionally more than PD and Tx (Figure 2). The growth of these modalities compared to 2008 was 20%, 14% and 5% for HD, PD and Tx, respectively. HD is the treatment of choice in the region (75%). PD is more commonly used only in El Salvador and Mexico (67.6% and 55.9%, respectively); also prevalent in Colombia, although the percentage of patients on PD in that country has declined in the last 10 years from 54% in 2000 to 31% in 2010.

Figure 2. Progression of the number of patients in RRT in Latin America per mode of treatment (1991-2010).



The Tx rate went from 3.7 in 1987 to 18.5 in 2010 (Figure 3), albeit with significant variations this year (28.2 pmp in Argentina to 0.5 pmp in Honduras). Because of its large population, there has been a high absolute number registered in Brazil (4,630 transplants performed in 2010); in addition to 197 pancreatic transplants performed in the region: 129 in Brazil, 58 in Argentina, 4 in Uruguay, 3 in Colombia, one in Cuba, one in Chile and one in Peru. The total number of transplants was 10,397 in 2010, with 58% coming from deceased donors, with the highest rates coming from Uruguay (96.8%), Cuba (94.9%), Colombia (92%) and Argentina (78,7%) (Figure 4).

Figure 3. Progression of the renal transplant rate (inhabitants pmp) in Latin America (1987-2010).

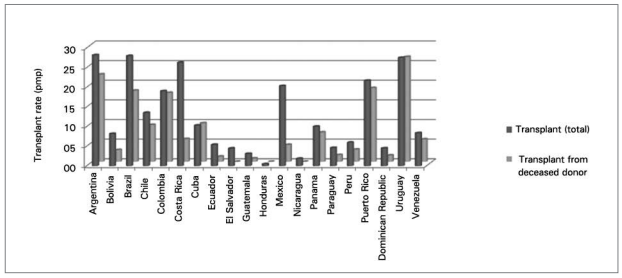
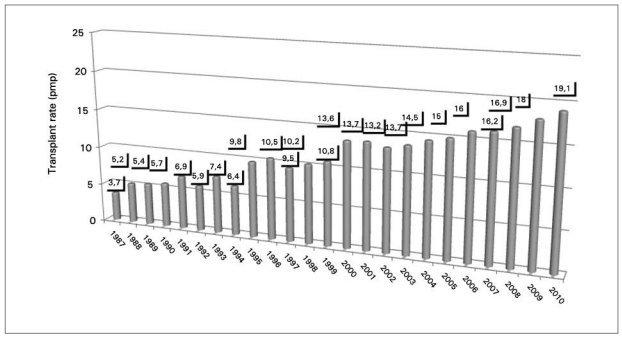


Figure 4. Renal transplant rate and deceased donors (pmp per capita) per country (2010).



The overall prevalence of RRT was directly correlated with gross domestic product (GDP) (r^2 0.86; $p < 0.05$) and life expectancy at birth (r^2 0.58; $p < 0.05$) (Figures 5 and 6). The prevalence of HD and Tx was also significantly correlated with the same indexes, while PD was not correlated with these variables. Thirteen countries reported incidence rates, representing 87% of the Latin American population (Table 1). There is a large incidence variation of 458 in Mexico and 10.7 pmp in Guatemala. Most countries in the region show either a stabilization trend or a minimal growth rate, except in Ecuador, where they had a significant growth in their incidence rate (38 in 2008 to 127 pmp in 2010). As in previous reports, the overall incidence rate was significantly correlated with GDP (r^2 0.63; $p < 0.05$).

Diabetes remains a major cause of CKD in RRT, with the highest incidences recorded in Puerto Rico (66.8%), Mexico (61.8%) and Colombia (42.5%) and the lowest incidences reported by Cuba (26.2%) and Uruguay (23.2%). The incidence of diabetes did not correlate with GDP or life expectancy at birth. The most frequent causes of death were cardiovascular (45%) and infectious (22%), while cancer accounted for 10% of all death causes.

Figure 5. Gross Domestic Product (GDP) and the prevalence of patients in RRT (2010).

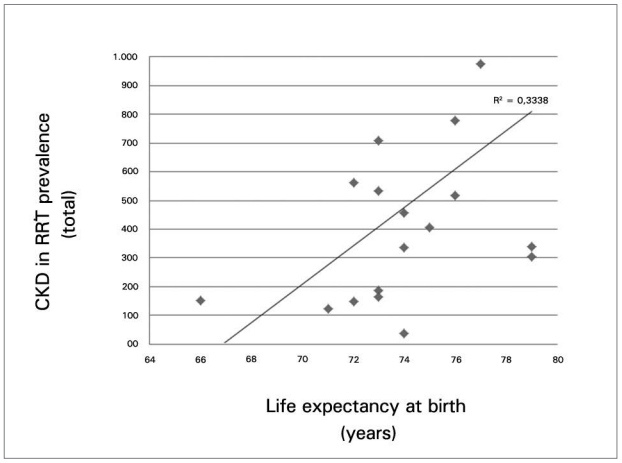
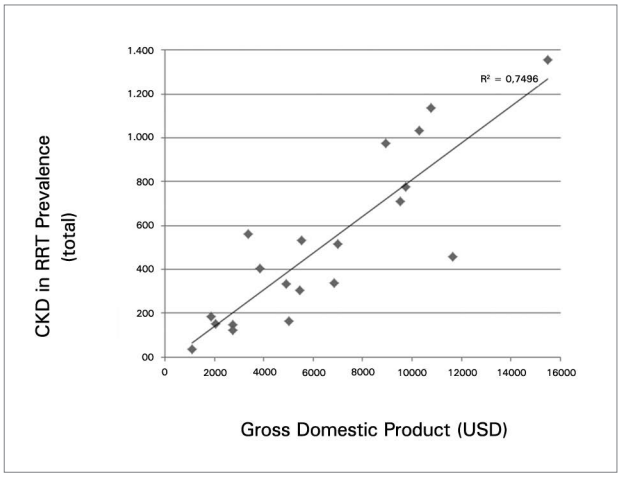


Figure 6. Life expectancy (in years) and correlated with the prevalence of patients in RRT (2010).



This report shows that the prevalence of CKD in RRT continues to increase in the region, particularly in countries that have universal public healthcare coverage. In these countries, where the incidence tends to stabilize or grow slowly, the increased prevalence is probably the result of an increase in life expectancy in the general population and the survival of patients on RRT. The incidence continues to grow, both in countries that have not yet achieved universal RRT coverage for the population and in those with an appropriate program of early detection and treatment of CKD and its associated risk factors.

PD is still an underutilized RRT mode in the region, in contrast to the continued expansion of HD - which is probably due to several factors, including the shortage of nephrologists and trained nurses, lack of health policies and financial support to promote this type of treatment. This treatment modality could be useful to overcome the difficulties that geographical conditions impose on some patients who need to travel long distances to access treatment in remote areas of large cities.

Although kidney transplant is available and increasingly used in Latin America, its growth was not as fast as it should be to compensate for the increased prevalence of patients on the waiting list. Whereas diabetes and hypertension remain the most common causes of admission to dialysis, CKD prevention programs should include early diagnosis and appropriate treatment of these diseases.

In most countries in the region, reporting on local registers is voluntary, generating great variability in the consistency of RLADTR data. For instance, the Mexican data is extrapolated from regional registries (Morelos state and Guadalajara) and the number of patients on RRT is estimated. In Brazil, although there is a recent initiative of organizing a National Register, the data comes from the Brazilian Dialysis Census - of voluntarily participation from both patients and clinics, thus generating estimate data.[13]

Finally, the RLADTR has strengths, among which we should emphasize its continuity over time since its inception in 1991, its contribution to the development of national registers, allowing comparisons between different countries and other regional registries, as well as enabling CKD in RRT trend analyzes in Latin America.

In short, diabetes and hypertension prevention and diagnosis programs, the implementation of appropriate policies to promote and allow PD expansion as well as the implementation of effective organ collection and Tx programs are needed in Latin America for further advances in the treatment of CKD. Cooperation between countries in the region, enabling the continuous annual data analysis, as well as the training of professionals in the implementation of registers in countries where they are not yet implemented, are the main objectives of RLADTR for the coming years.

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Authors

Roberto Pecoits-Filho[1], Guillermo Rosa-Diez[1], Maria Gonzalez-Bedat[1,2], Sergio Marinovich[3], Sdenka Fernandez[4], Jocemir Lugon[5], Hugo Poblete-Badal[6], Susana Elgueta-Miranda[6], Rafael Gomez[7], Manuel Cerdas-Calderon[8], Miguel Almaguer-Lopez[9], Nelly Freire[10], Ricardo Leiva-Merino[11], Gaspar Rodriguez[12], Jorge Luna-Guerra[13], Tomasso Bochicchio[14], Guillermo Garcia-Garcia[14], Nuria Cano[15], Norman Iron[15], Cesar Cuero[16], Dario Cuevas[17], Carlos Tapia[18], Jose Cangiano[19], Sandra Rodriguez[20], Haydee Gonzalez[21], Valter Duro-Garcia[22]

[1] Latin American Dialysis and Kidney Transplant Register (RLADTR) Committee, Latin American Society of Nephrology and Hypertension; [2] RLADTR at the Uruguayan Society of Nephrology; [3] RLADTR at the Argentinian Society of Nephrology; [4] RLADTR at the Bolivian Society of Nephrology; [5] RLADTR at the Brazilian Society of Nephrology; [6] RLADTR at the Chilean Society of Nephrology; [7] RLADTR at the Colombian Society of Nephrology; [8] RLADTR at the Costa Rican Society of Nephrology; [9] RLADTR at the Cuban Society of Nephrology; [10] RLADTR at the Ecuadoran Society of Nephrology; [11] RLADTR at the Salvadoran Society of Nephrology; [12] RLADTR at the Honduran Society of Nephrology; [13] RLADTR at the Guatemalan Society of Nephrology; [14] RLADTR at the Mexican Society of Nephrology; [15] RLADTR at the Nicaraguan Society of Nephrology; [16] RLADTR at the Panamanian Society of Nephrology; [17] RLADTR at the Paraguayan Society of Nephrology; [18] RLADTR at the Peruvian Society of Nephrology; [19] RLADTR at the Puerto Rican Society of Nephrology; [20] RLADTR at the Dominican Society of Nephrology; [21] RLADTR at the Venezuelan Society of Nephrology; [22] RLADTR at the Latin American and Caribbean Society of Transplants.