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BLOOD TRANSFUSION SAFETY: PROGRESS REPORT

Background

1. Since 1975 the World Health Assembly, the World Health Organization Executive Board and the Directing Council of the Pan American Health Organization have adopted several resolutions urging Member States to promote the establishment of coordinated blood services based on voluntary non-remunerated blood donation and on quality assurance, and to enact legislation and formulate national blood policies that facilitate the cost-effective organization and operation of blood services. The Governing Bodies have made it clear that it is necessary for the Member States to focus on blood transfusion safety as a means to improve patient care and to reduce the burden of HIV and other infections in the general population.
2. In 1999 the Directing Council of the Pan American Health Organization adopted resolution CD41.R15 and an Plan of Action that pursued the universal screening of blood units for HIV, hepatitis B (HBV), hepatitis C (HCV), and syphilis in the Region, and for *T. cruzi* in continental Latin America, universal participation of blood banks in programs of external evaluation of performance, 50% voluntary blood donation and the monitoring of high-risk groups for transfusion-transmitted infections. These expected results were not achieved by 2005.
3. In 2005, the Directing Council of the Pan American Health Organization adopted Resolution CD46.R5, which urged the Member States to adopt the Regional Plan of Action for Transfusion Safety 2006-2010 and requested the Director to report periodically to the Governing Bodies on the progress of its implementation.
4. The objective of Regional Plan of Action for Transfusion Safety is to contribute to the reduction of mortality and to the improvement of patient care by making safe blood available in a timely manner for all those patients who need it. The Plan involves four

strategies, Planning and Management of the National Blood Network System, Promotion of Voluntary Blood Donation, Quality Assurance and Appropriate Use of Blood and Blood Components, and identified nine indicators of progress based on regional data for the period 2000-2003.

Regional Situation in 2005

Screening Coverage

5. In 2003, 99.93% of the units collected by the Latin American and Caribbean countries that officially submitted reports to the Pan American Health Organization were screened for HIV, 99.86% were screened for HBV, 99.52% were screened for HCV, and 99.84% were screened for syphilis. The proportions of units that were screened for the four markers decreased to below 99% in 2004 and 2005 (Table 1). A negative trend was also observed for *T. cruzi*: the rates of screening were 87.17%, 86.20% and 87.06% in 2003, 2004 and 2005, respectively (Table 2).

6. In 2003 there were 19 (46%) countries that reported universal screening of all markers; there were 17 (41%) and 22 (54%) countries that screened all the collected units in 2004 and 2005, respectively (Table 3). Bolivia, Colombia, Honduras, Mexico, Nicaragua, Paraguay and Peru did not test all units for markers of viral infections in 2005. Nevertheless, two countries—Mexico and Peru—contributed 98.8% and 99.6% of the units that were not screened for HIV in 2004 and 2005, respectively. Anguilla, Belize, Dominica, and St. Kitts and Nevis reported zero screening for HCV in 2005.

External Performance Evaluation

7. The Regional Programs for External Performance Evaluation continued with the support from the Spanish Agency for International Cooperation, the UKNEQAS, the International Consortium for Blood Safety, the Hemocentro in Sao Paulo, Brazil, and the Sevilla Transfusion Center in Spain (Tables 4 and 6). The purpose of these regional programs is to support the national reference centers that are responsible for organizing the national programs with participation of all local services. Local participation, nevertheless, is limited: in 2003 there were 1,330 (53.01%) national centers participating in national programs for external performance evaluation of serology for transfusion-transmitted infections. The proportion of participants decreased to 46.66% and 46.42% in 2004 and 2005 (Table 5).

8. Results from both the Regional and National Programs for External Performance Evaluation indicate that the quality of screening for serological markers of transfusion-transmitted infections has improved over the last four years. Some weaknesses remain in the immunohematological assays.

Blood Donors

9. The proportion of voluntary blood donors in Latin American and Caribbean countries was 36.06% in 2003; that same year, 0.34% of blood units were collected from paid donors (Table 7). The proportion of voluntary blood donors remained unchanged between 2003 and 2005, although there was a reduction to 33.05% in 2004. Recognized paid donors accounted for only 0.19% of all units collected in 2005 (Table 7), but the actual number of individuals who receive money in exchange of their blood is unknown. In 2003, there were seven (17%) countries that reported more than 50% voluntary blood donors; Aruba, Brazil, Cayman Islands, Colombia, Costa Rica, Cuba, Curacao, St. Lucia, and Suriname did so in 2005.

10. The median prevalence rate of infectious markers among blood donors was always higher in countries with less than 50% voluntary donation than in those countries with more than 50% voluntary donors (Table 8). Nevertheless, it is noteworthy that, while the prevalence rates of markers remained unchanged in the former group of countries, the rates for countries with more than 50% voluntary donors tended to increase from 2002 to 2005 (Table 8).

11. The higher rate of prevalence of infectious markers among donors in some countries and the larger number of units that were not screened in 2004 and 2005 resulted in higher estimates of transfusion-transmitted infections. In 2002 and 2003 the estimated numbers of HIV infections associated with transfusions were six per year. The corresponding numbers for 2004 and 2005 are 57 and 55, respectively (Table 9). There were also significant increases in the estimated number of HBV and HCV transfusion-associated infections (Table 9).

Availability and Safety of Blood for Transfusion

12. The number of blood units collected in Latin America and the Caribbean increased from 7,325,093 in 2003 to 8,059,960 in 2005 (Table 10). The corresponding donation rates were 121.5/10,000 inhabitants in 2003, and 145.0/10,000 in 2005. There was, however, a wide range among national donation rates in 2005: the rate for Haiti was 12.7 and that for Cuba was 439.6. In all, there were 15 (42%) countries with donation rates below 100/10,000 inhabitants and five (14%) with rates above 200 (Table 13).

13. The actual availability of blood at the national level is affected by the prevalence of infectious markers among blood donors –units from donors who are found to have an infectious marker must not be used for transfusions. In 2005, the cumulative proportion of units discarded because they were reactive/positive in the laboratory tests varied from 0.03% in Curacao to 11.00% in Bolivia, with a median of 3.11 (Table 13). There were at least 3,562 (4.28%) units discarded in the Caribbean countries and 235,134 in Latin

America due to reactivity/positivity in laboratory tests, although some countries did not test any of the units collected for markers of HCV and HTLVII and others reported the rate of donors that were confirmed as positive after being reactive in screening test. The 238,696 units discarded, at a direct cost of basic supplies of US\$ 56 per unit, represented a loss of \$13.4 million.

14. In the Caribbean and Latin American countries, rates of national availability of blood for transfusion are inversely related to national maternal mortality ratios and proportion of maternal deaths associated with hemorrhage.

15. In Latin America, transfusions are given primarily to treat medical and not surgical conditions; one of every seven patients who receive transfusions is under one year of age. Reduction of infant mortality, therefore, must consider availability of blood.

16. Treatment of road traffic injuries, which are predicted to increase by 67% by the year 2020, requires transfusions. Almost two thirds of blood used among patients of acute trauma is given during the first 24 hours of care. Timely availability of blood at the emergency services is a determinant factor of patient survival.

17. The risk of receiving a blood unit contaminated with HIV, HBV or HCV for lack of laboratory screening increased from 1 in 41,858 donations in 2003 to 1 in 11,784 donations in 2005. (Table 10). The risk was 8.79 times higher for HCV and 2.67 times higher for HBV than for HIV (Table 9). In continental Latin America, there the risk of receiving a *T. cruzi* positive transfusion was 1 in 3,377 donations in 2005 which is similar to the risk observed in 2003, (1 in 3,330 donations) (Table 10).

Efficiency of National Blood Systems

18. In Latin America, where countries collected between 42,771 and 3,738,580 units of blood in 2005, there is a wide range in the mean number of units processed by the individual blood services in a year: from 761 units in Argentina to 10,320 in Cuba. The seven countries with lowest mean annual collection per service had an average of 11% voluntary blood donors; while the average voluntary donation was 51% in the six countries with the highest mean annual collection per service (Table 11). The mean donor deferral rate was lower, 7.9%, in the six countries with highest annual collection per service than in the other two groups of countries, 20.1% and 24.7%. Furthermore, the blood donation rate was 100.85 per 10,000 inhabitants in the group of countries with the less efficient blood collection systems, 115.90 in the intermediate group and 186.81 in the group of countries with blood services that collected a mean of 5,888 units per year (Table 11). There was no difference in the proportion of blood units discarded which fluctuated around 10% in the three groups of countries, (Table 11).

19. It is estimated that 603,950 units of red blood cells became outdated and were discarded in Latin America in 2005, for an estimated loss of \$33.8 million.

20. In the Caribbean, where countries collected between 114 and 22,155 units of blood in 2005, donor deferral varied between 0 and 53%, with a median of 20%. The estimated number of deferred donors was 29,152 in 2005. Seven countries had deferral rates below 10%; the rate was between 20 and 53% in the other eight countries (Table 12). The median blood donation rate in the first group of countries was 167.6 (range 108.4 – 368.6) per 10,000 inhabitants, and 87.7 (range 12.7 – 118.9) in the second group. The median proportion of units that were reactive for any of the infectious markers was 0.90% (range 0.03 – 6.85%) in the first group and 4.09% (range 0.40 – 10.25%) in the second. Aruba, Cayman Islands, Curacao, and Suriname, the four countries with 100% voluntary blood donors, are in the first group.

21. It is estimated that 6,425 units of red blood cells became outdated and were discarded in the Caribbean countries in 2005, for a loss of \$360,000. The median proportion of red blood cells discarded was 5.9% (range 2.0 – 15.7%) among countries with lower blood donor deferral rates, and 10.8% (range 1.8 – 14.7%) among countries with higher proportion of deferred donors (Table 12).

Progress since 2005

22. The 2006-2010 Regional Plan of Action has nine progress indicators.

- In order to strengthen the organizational and functional capacities of the national blood systems, the legal framework is to be revised. Argentina, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Paraguay, Guyana, Haiti and Jamaica have either started or completed the process. Only Paraguay has enacted a revised blood law.
- To allow the development of national plans, the allocation of resources and appropriate evaluation of the national blood systems, the Regional Plan of Action included structured surveys to estimate the geographic and temporary blood requirements and blood components in the country. Aruba, Cuba, Curacao, Haiti, Paraguay, and Suriname have those estimates. Argentina, Bahamas, British Virgin Islands, Colombia, Costa Rica, Grenada, Guatemala, El Salvador, St. Vincent and the Grenadines have either gross or partial estimates that do not take geographic and time variables into consideration.
- Considering that sufficiency and safety of blood can only be achieved through voluntary blood donation, the countries adopted the goal of collecting more than 50% of their blood units from voluntary blood donors. Aruba, Brazil, Cayman

- Islands, Colombia, Costa Rica, Cuba, Curacao, St. Lucia, and Surinam have achieved this goal.
- Brazil, Colombia, Costa Rica, Cuba, Curacao, Haiti, Paraguay and Suriname have initiated the implementation of national quality assurance programs.
 - To facilitate better patient care and planning of the national blood systems it is necessary to develop national guidelines for the clinical use of blood. Aruba, Belize, Bolivia, Brazil, Costa Rica, Cuba, Curacao, Ecuador, El Salvador, Guyana, Haiti, Jamaica, Mexico, Nicaragua, and Paraguay have prepared their guidelines.
 - Belize, Costa Rica, Cuba, Guyana, Nicaragua, Suriname have established national blood transfusion committees.
 - Brazil, Colombia, Cuba, and Nicaragua have implemented hemovigilance systems.
 - Colombia, Cuba, Curacao, and Nicaragua prepared components in at least 95% of the blood units collected.
 - Nine Latin American countries –Argentina, Brazil, Colombia, Cuba, El Salvador, Mexico, Nicaragua, Panama and Paraguay have designed a regionalized national system for blood collection and processing.

Lessons Learned, Enablers and Obstacles for Progress, and Recommendations

23. Progress was made in blood safety in the Region of the Americas from 2000 to 2003 (Tables 1, 2, 3, 7, 9, 10). Unfortunately, despite the fact that some countries initiated or achieved universal screening of blood for infectious markers, the overall risk of receiving a virus-contaminated transfusion –estimated by using the number of unscreened blood units and the prevalence of infectious markers among blood donors–increased almost fourfold from 2003 to 2005 (Table 10).

24. Similarly, the proportion of voluntary blood donors in the Region increased from 15% in 2000 to 36% in 2003, but remained unchanged in the last two years (Table 7). Despite the increase in the number voluntary blood donors, the proportion of those who are reactive/positive for infectious markers gradually increased from 2003 to 2005 (Table 8). This observation is associated with first-time or sporadic voluntary blood donors and underscores the need to pursue repeated and regular voluntary blood donation.

25. The number of blood units to be collected annually determines resources necessary to recruit blood donors, to procure supplies, and to collect, process, store and distribute blood components. It is difficult to appropriately plan and allocate national resources to blood systems when the need for blood and blood components in the country and the impact of blood transfusions on the well-being of the patients who receive them are unknown.

26. Central national health authorities have difficulties in organizing the different sectors (provincial or state authorities, social security, private and non-profit organizations) to implement national blood collection, processing and transfusion systems because the local factors that determine availability, opportunity, safety and efficacy of blood for transfusions are not taken into consideration for planning. In countries where structured efforts are being made, the political will and the technical skills of those at the normative level within the ministry of health determine the level of success. The permanent technical involvement of the Pan American Health Organization Country Office is an important factor.

27. Regional work plans approved by the Directing Council in 1999 and in 2005 included the achievement of the goal of 50% voluntary blood donation. This goal was agreed upon by the national blood programs in order to induce gradual changes that would be acceptable by health workers. In retrospect, aiming for 50% voluntary blood donation results in policy, ethical and operational challenges since half of the recipient patients have to provide replacement donors, voluntary and replacement donors are handled differently by the blood services, and the access to blood in healthcare facilities is hindered by administrative processes of cost recovery. Pursuing the goal of 100% voluntary blood donation in the short term will result in the multidisciplinary operational approaches that were identified as vital in 2005.

28. Blood services need to work in three different spheres: (a) the community, to educate, recruit, select and maintain a healthy and committed donor pool; (b) within the blood processing center, as a factory of essential medicaments and (c) the clinical services where patients are treated. Staffs with appropriate competencies, adequate infrastructure and sufficient resources are necessary to educate and service voluntary blood donors, to manage blood processing facilities and to administer, monitor and evaluate blood transfusions.

29. The current organizational system results in a loss of financial resources, limits the efficacy of blood transfusions and has negative effects on morbidity and mortality.

30. The concepts of Resolution CD46.R5 still apply to the Region of the Americas but action is required by national authorities to implement the strategies of the Regional Plan of Action for Transfusion Safety 2006-2010, approved by the 46th Directing

Council. It is recommended that the Ministries of Health support their national blood systems using the Health Agenda for the Americas 2008-2017 as the general framework.

31. Blood for transfusions should be considered an essential medicament, a national resource and a public good.

32. It is recommended that the Ministries of Health make a specific entity within their normative level responsible for the planning, oversight and overall efficient operation of the national blood system. The normative level must be clearly separated from the operational one.

33. The normative level should be staffed by personnel from multiple disciplines with competences in planning, management and public health. The National Blood Program should work closely with other groups within the Ministry of Health –Health Promotion, Maternal and Child Health, Immunization, Prevention and Control of Communicable Diseases, Cancer Prevention and Control, Adolescent Health, Pharmacovigilance, Patient Safety- and with other sectors –Ministry of Education, Ministry of Labor, Social Security.

34. The operational level should consider: (1) procurement, collection, processing and distribution of blood components and (2) transfusion services. The processing centers should not be part of the individual hospitals. Consolidated processing facilities should be responsible for distributing sufficient blood components to a determined group of hospitals. In the smaller Caribbean countries the hospital laboratories may be used to process blood units, but the responsibility for donor education, selection and recruitment, and for blood collection should be independent from the hospital administration.

35. Efforts should be made to estimate the annual national need for blood and blood components, by geographic area and by month. The national guides for clinical use of blood and the potential number of cases of the clinical conditions that require transfusions, including voluntary and involuntary injuries, should be used as the basis for the estimate. In order to cover unforeseen emergencies—natural or man made disasters, infectious outbreaks, emergency vaccination campaigns—it is recommended that the national blood systems have an additional stock equivalent to 4%—or two weeks—of the annual need.

36. The annual estimates of blood needs should take into consideration the expected increases in (a) numbers of the general and elderly population, (b) social inclusion of currently excluded populations, (c) road traffic injuries, and (d) local adoption of medical technologies, such as organ transplants. Sufficient financial resources to collect and distribute enough blood components should be made available to the corresponding responsible unit within the Ministry of Health. National financial resources that are currently being wasted should be invested towards this effort.

37. The number of repeat donors needed in each country should be estimated at least as 50% of the national need of red blood cells. A national program should be put in place to educate and recruit healthy individuals as regular blood donors and to have them donate at least twice a year.

38. Ministries of health should work to terminate replacement and paid donation before the end of 2009, with the goal of 100% voluntary, altruistic, non-remunerated donors, using the information obtained in the socio-anthropological surveys conducted in at least 18 of the Caribbean and Latin American countries.

39. A social network of volunteers should be established to help educate the community, to promote voluntary blood donation, and to service the donor. Youth programs, such as Pledge 25, should be given special attention.

40. National public information strategies should be developed to inform the community on the national needs for blood and blood components, the cost involved in procurement and processing of blood units, the daily level of coverage of the estimated need of blood, and the impact of transfusions on the well being of the patients.

41. Hospital transfusion services should be staffed by medical specialists. Clinical laboratories in hospitals should actively participate in the evaluation of patients both before and after transfusions. Hospital transfusion committees should assess the clinical management of patients and the pertinence of hospital transfusion guidelines.

42. PAHO country offices should have staff especially dedicated to coordinate the technical cooperation given by PAHO on issues pertaining to blood transfusion safety. A coordinated approach is necessary at all levels of the Organization.

43. Local and national data on blood availability and safety and on blood transfusion efficiency should be analyzed periodically by the national health authorities and other stakeholders, including patient groups, blood donors and community volunteers.

Action by the Executive Committee

44. The Executive Committee is invited to review this report, to adopt a resolution, and to convey the members of the Directing Council the need to support blood transfusion safety as a means to improving patient care and reducing the burden of HIV and other infections in the general population.

Annex

Table 1: Number and percent of blood units screened in the Region between 2000-2005

	2000	2003	2004	2005
Units collected (N)	6 409 596	7 325 093	7 559 080	8 059 960
Units screened for HIV	6 387 790 (99.66)	7 320 292 (99.93)	7 466 769 (98.77)	7 972 085 (98.91)
Units screened for HBV	6 387 247 (99.65)	7 315 191 (99.86)	7 460 221 (98.69)	7 966 011 (98.83)
Units screened for HCV	6 332 331 (98.79)	7 290 038 (99.52)	7 448 173 (98.53)	7 963 998 (98.81)
Units screened for syphilis	6 381 752 (99.57)	7 313 335 (99.84)	7 383 987 (97.68)	7 900 040 (98.02)

Table 2: Number and percent of units screened for *T. cruzi* in Latin America between 2000-2005

	2000	2003	2004	2005
Units to be screened (N)	5 700 259	7 097 339	6 888 289	7 419 274
Units screened	4 502 114 (78.98)	6 251 932 (88.09)	5 938 183 (86.20)	6 459 612 (87.06)

Table 3: Number and percent of countries reporting universal screening between 2000-2005

	2000	2003	2004	2005
HIV	31/37 (83.8)	33/38 (89.2)	29/37 (78.4)	32/36 (88.9)
HBV	30/37 (81.1)	33/38 (89.2)	29/37 (78.4)	32/36 (88.9)
HCV	19/37 (51.3)	23/38 (62.5)	20/37 (54.1)	24/36 (66.7)
Syphilis	32/37 (86.5)	33/38 (89.2)	30/37 (81.1)	31/36 (86.1)
<i>T. cruzi</i>	6/17 (35.3)	7/17 (41.2)	8/17 (47.1)	12/17 (70.6)

Table 4: Participation in Regional PEED for TTI between 2000-2005

	2000	2003	2004	2005
Number of Latin American countries	18	18	18	18
Number of Caribbean countries	0	18	20	20
Number of Latin American centers	20	20	20	21
Number of Caribbean centers	0	22	21	24

Table 5: Participation in national PEED for TTI between 2002-2005

	2000	2003	2004	2005
Number of centers in Latin America	4 738	2 509	3 071	2 546
Number of participating centers	1 129	1 330	1 433	1 182
% participation	23.82	53.01	46.66	46.42
Number of countries with national PEED	11	16	16	17

Table 6: Number of participants in regional PEED for immunohematology in Latin America and the Caribbean between 2000-2005

	2000	2003	2004	2005
Latin America	24	30	29	48
Caribbean	0	24	24	24

Table 7: Number and percent of voluntary and paid donors between 2000-2005

	2000	2003	2004	2005
Units collected (N)	6 409 596	7 325 093	7 559 080	8 059 960
Voluntary donors (N) (%)	989 885 (15.44)	2 641 739 (36.06)	2 498 174 (33.05)	2 950 018 (36.60)
Paid donors (N) (%)	31 725 (0.50)	24 925 (0.34)	25 398 (0.34)	15 507 (0.19)

Table 8: Median prevalence (percent) of markers for TTI according to proportion of voluntary blood donors between 2000-2005

Marker	Countries with	2000	2003	2004	2005
HIV	< 50% VBD	0.21	0.28	0.23	0.26
	> 50% VBD	0.13	0.01	0.01	0.02
HBsAg	< 50% VBD	0.60	0.60	0.62	0.60
	> 50% VBD	0.37	0.18	0.19	0.26
HCV	< 50% VBD	0.56	0.56	0.52	0.58
	> 50% VBD	0.10	0.06	0.08	0.11
Syphilis	< 50% VBD	0.97	0.92	0.97	1.00
	> 50% VBD	0.55	0.13	0.14	0.18

Table 9: Estimated indicators of blood safety between 2000-2005

Variable	2000	2003	2004	2005
HIV infections transfused (N)	30	6	57	55
Risk of HIV per 100,000 donations	0.47	0.08	0.75	0.68
HBV infections transfused (N)	1 357	22	176	147
Risk of HBV per 100,000 donations	21.18	0.30	2.32	1.82
HCV infections transfused (N)	211	147	537	482
Risk of HCV per 100,000 donations	3.29	2.00	7.10	5.98
<i>T. cruzi</i> infections transfused (N)	7 483	2 193	2 374	2 362
Risk of <i>T. cruzi</i> per 100,000 donations	131.23	28.22	34.46	31.88

Table 10: Availability and safety of blood between 2000-2005

	2000	2003	2004	2005
Number of units collected	6 409 596	7 325 093	7 559 080	8 059 960
Donation rate per 10,000	126.8	138.6	139.4	145.0
Risk of viral transfusion	1: 4 011	1: 41 858	1: 9 817	1: 11 784
Risk of <i>T. cruzi</i> transfusion	1: 762	1: 3 340	1: 3 150	1: 3 377

Table 11: Efficiency of national blood systems in Latin America, 2005

Variable	Group1	Group 2	Group 3
	Argentina Dominican Republic Uruguay Venezuela Guatemala Panama Peru	Bolivia Nicaragua Chile Honduras Mexico El Salvador	Costa Rica Paraguay Colombia Ecuador Brazil Cuba
Mean number of units collected per bank	1,404	2,334	5.888
Mean GNP per capita (US \$)	3,664	3,123	2,628
Population x 1,000	121,613	152,079	266,987
Units collected	1,226,526	1,762,623	4,987,588
Donation rate per 10,000	100.85	115.90	186.81
Mean voluntary donors (%)	11.0	18.5	51.3
Mean donor deferral (%)	20.1	24.7	7.9
Mean units discarded (%)	10.7	9.9	10.3

Table 12: Efficiency of national blood systems in the Caribbean, 2005

Group 1	Donor deferral rate (%)	Voluntary donors (%)	Prevalence TTI (%)	Discard rate (%)
St Kitts and Nevis	0	3	6.85	NR
Curacao	0.3	100	0.03	2.0
Aruba	2	100	0.90	2.0
Suriname	4.6	100	0.14	5.9
Bahamas	5	15	2.23	15.70
Dominica	9	5	5.41	7.1
Cayman Islands	10	100	0.11	20.0
Group 2				
St. Vincent and the Grenadines	20	13	6.68	12.7
Guyana	24	22	4.09	6.5
Grenada	26.7	30	4.20	10.8
Haiti	27	15	10.25	7.2
Belize	39.0	9	1.89	11.5
St. Lucia	39.1	82	1.55	14.7
Trinidad and Tobago	44	13	4.69	NR
Anguilla	53	10	0.40	1.8

Table 13: Blood donation rate per 10,000 inhabitants and proportion of units reactive/positive for infectious markers in 2005.

Country	Donation rate	% TTI markers	Country	Donation rate	% TTI markers
Anguilla	87.7	0.40	Argentina	94.2	6.49
Aruba	367.8	0.90	Bolivia	50.9	11.00
Bahamas	159.5	2.23	Brazil	200.5	2.93
Belize	115.1	1.89	Chile	109.2	1.54*
British Virgin Islands	194.3	0.22	Colombia	115.7	3.11
			Costa Rica	125.1	0.49*
Cayman Islands	196.4	0.11	Cuba	439.6	1.65*
Curacao	368.6	0.03	Ecuador	94.3	0.39*
Dominica	109.7	5.41	El Salvador	116.5	3.98
Grenada	92.8	4.20	Guatemala	61.3	6.39
Guyana	70.1	4.09	Honduras	72.6	3.98
Haiti	12.7	10.25	Mexico	126.2	1.89
Jamaica	83.6	5.40	Nicaragua	98.6	3.82
St Kitts and Nevis	108.4	6.85	Panama	132.3	1.28
St Lucia	118.9	1.55	Paraguay	76.4	9.98
St. Vincent and the Grenadines	69.0	6.68	Peru	64.2	3.92
			Dominican	69.8	3.74
Suriname	167.6	0.14	Uruguay	276.3	1.32
Trinidad and Tobago	104.4	4.69	Venezuela	150.8	3.71

* Reported tests confirmed as positive. The rest of the countries reported units that were reactive in screening tests.