

# Epidemiology of Human T-cell Lymphotropic Virus Type 1 Infection in Blood Donors, Israel

## Technical Appendix

### Classification of Countries for Determination of Ethnic Origin

#### Asia

Bangladesh, Bhutan, Cambodia, People's Republic of China, Hong Kong, India, Indonesia, Japan, Republic of Korea, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, the Philippines, Singapore, Sri Lanka, Taiwan, People's Republic of China, Thailand, Vietnam

#### Central/South America

Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru, Puerto Rico, Suriname, Trinidad and Tobago, Uruguay, Venezuela

#### Eastern Europe

Albania, Belarus, Bulgaria, Czechoslovakia (no longer exists), Estonia, Hungary, Latvia, Lithuania, Republic of Moldova, Poland, Romania, Russian Federation, Ukraine, Union of Soviet Socialist Republics (no longer exists), Yugoslavia (no longer exists)

#### Western Europe

Austria, Belgium, Denmark, Finland, France, Germany, Greenland, Iceland, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom (Great Britain).

#### Middle East

Afghanistan, Armenia, Azerbaijan, Cyprus, Georgia, Greece, Iraq, Islamic Republic of Iran, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, Saudi Arabia, Syrian Arab Republic, Tajikistan, Turkey, Turkmenistan, Uzbekistan, Yemen

**North Africa**

Algeria, Egypt, Libyan Arab Jamahiriya, Morocco, Sudan, Tunisia

**North America**

Canada, United States of America

**Oceania**

Australia, New Zealand, Papua New Guinea

**Sub-Saharan Africa**

Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Republic of Congo, Côte d'Ivoire (Ivory Coast), Equatorial Guinea, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Somalia, Sierra Leone, Senegal, Rwanda, Nigeria, Niger, Nepal, Namibia, United Republic of Tanzania, Togo, Uganda, Zaire, Zambia, Zimbabwe

Technical Appendix Table. Worldwide prevalence of human T-cell lymphotropic virus 1 (HTLV-1) carriers among blood donors\*

Region and location of study population	No. donors tested	No. HTLV-1-positive donors	Prevalence/100,000 population	Ref.
<b>Eastern Europe</b>				
Latvia	150	0	0	(1)
Romania	621	4	640	(2)
Russia, Moscow†	NA	NA	1,400	(3)
<b>Western Europe</b>				
Denmark	NA	NA	2	(4)
Europeans without obvious risk factors	NA	NA	1–2	(4)
France	NA	NA	7	(4)
France	1,816,927	66	3.9	(5)
The Netherlands	674,000	15	2	(4)
Southwestern Greece	107,302	NA	5.6	(6)
Spain	530,000	NA	1.1	(7)
Sweden	235,000	6	2	(4)
		(countries of origin: Sweden, 3; Denmark, 1; UK, 1; Iran, 1; Chile, 1)	(crude; 1 if born in Sweden, 1.3 if born in Europe)	
Sweden	612,000	6	1	(8)
Italy	68,520	5	7	(8)
United Kingdom	NA	NA	5	(4)
<b>North America</b>				
Canada‡	81,962	10	12.2	(9)
USA	39,898	10	25	(10)
USA‡	NA	NA	9.6	(11)
USA	6,400,000	442	7	(8)
<b>Latin America</b>				
Argentina	76 246	25	33	(12)
Argentina, Buenos Aires	86,238	NA	34	(13)
Brazil	6,218,619	NA	40–1,000	(14)
Caracas, Venezuela	23 413	23	98	(15)
<b>Middle East</b>				
Iran, Mashhad	28,928	208	770	(16)
Saudi Arabia	16,434	9	40	(17)
Lebanon	1,900	0	0	(18)
Turkmenistan	1,510	3	199	(19)
<b>North Africa</b>				
Egypt	133	3	2,255	(20)
Tunisia	500	1	50	(21)
<b>Sub-Saharan Africa</b>				
Burkina Faso	191	2	1,047	(22)
Senegal	4,900	7	143	(23)
<b>Asia</b>				
India§	10,000	18	180	(24)
Russia, Komsomol'sk-na-Amure†	NA	NA	1,600	(3)
Russia, Yuzhno-Sakhalinsk†	NA	NA	5,450	(3)

\*Ref., reference; NA, not available.

†By passive agglutination.

‡By ELISA.

§Combined HTLV-1 and HTLV-2.

## References

1. Kozireva S, Nemceva G, Danilane I, Pavlova O, Blomberg J, Murovska M. Prevalence of blood-borne viral infections (cytomegalovirus, human herpesvirus-6, human herpesvirus-7, human herpesvirus-8, human T-cell lymphotropic virus-I/II, human retrovirus-5) among blood donors in Latvia. *Ann Hematol.* 2001;80:669–73. [Medline DOI: 10.1007/s002770100359](https://doi.org/10.1007/s002770100359)
2. Paun L, Ispas O, Del Mistro A, Chieco-Bianchi L. HTLV-I in Romania. *Eur J Haematol.* 1994;52:117–8. [Medline](#)

3. Seniuta NB, Iakovleva LS, Stepina VN, Buachidze LN, Gurova EP, Kologrivova ZA, et al. [Screening of sera from the adult populations of some USSR regions for antibodies to the human T-cell leukemia virus type I (HTLV-I)]. *Vopr Virusol.* 1990;35:309–12. [Medline](#)
4. Tynell E, Andersson S, Lithander E, Arneborn M, Blomberg J, Hansson HB, et al. Screening for human T cell leukaemia/lymphoma virus among blood donors in Sweden: cost effectiveness analysis. *BMJ.* 1998;316:1417–22. [Medline](#)
5. Courouce AM, Pillonel J, Lemaire JM, Maniez M, Brunet JB. Seroepidemiology of HTLV-I/II in universal screening of blood donations in France. *AIDS.* 1993;7:841–7. [Medline](#)
6. Tseliou PM, Spanakis N, Spiliotakara A, Politis C, Legakis NJ, Tsakris A. HTLV-I and -II in southwestern Greece. *Transfusion.* 2003;43:1641–2. [Medline DOI: 10.1046/j.1537-2995.2003.00569.x](#)
7. Toro C, Rodes B, Aguilera A, Caballero E, Benito R, Tuset C, et al. Clinical impact of HTLV-1 infection in Spain: implications for public health and mandatory screening. *J Acquir Immune Defic Syndr.* 2002;30:366–8. [Medline](#)
8. Courouce AM, Pillonel J, Saura C. Screening of blood donations for HTLV-I/II. *Transfus Med Rev.* 1999;13:267–74. [Medline DOI: 10.1016/S0887-7963\(99\)80057-1](#)
9. O'Brien SF, Yi Q-L, Fan W, Scalia V, Kleinman SH, Vamvakas EC. Current incidence and estimated residual risk of transfusion-transmitted infections in donations made to Canadian Blood Services. *Transfusion.* 2007;47:316–25. [Medline DOI: 10.1111/j.1537-2995.2007.01108.x](#)
10. Williams AE, Fang CT, Slamon DJ, Poiesz BJ, Sandler SG, Darr WF, et al. Seroprevalence and epidemiological correlates of HTLV-I infection in U.S. blood donors. *Science.* 1988;240:643–6. [Medline DOI: 10.1126/science.2896386](#)
11. Dodd RY, Notari EP, Stramer SL. Current prevalence and incidence of infectious disease markers and estimated window-period risk in the American Red Cross blood donor population. *Transfusion.* 2002;42:975–9. [Medline DOI: 10.1046/j.1537-2995.2002.00174.x](#)
12. Remesar M, Mangano A, Sen L, del Pozo A. Profile of human T-cell lymphocytotropic virus-I/II infections in an Argentinean blood bank population. *Vox Sang.* 2002;83:364–5. [Medline DOI: 10.1046/j.1423-0410.2002.00240.x](#)
13. Mangano AM, Remesar M, del Pozo A, Sen L. Human T lymphotropic virus types I and II proviral sequences in Argentinian blood donors with indeterminate Western blot patterns. *J Med Virol.* 2004;74:323–7. [Medline DOI: 10.1002/jmv.20172](#)

14. Catalan-Soares B, Carneiro-Proietti AB, Proietti FA. Heterogeneous geographic distribution of human T-cell lymphotropic viruses I and II (HTLV-I/II): serological screening prevalence rates in blood donors from large urban areas in Brazil. *Cad Saude Publica*. 2005;21:926–31. [Medline DOI: 10.1590/S0102-311X2005000300027](#)
15. Leon G, Quiros AM, Lopez JL, Hung M, Diaz AM, Goncalves J, et al. [Seropositivity for human T-lymphotropic virus types I and II among donors at the Municipal Blood Bank of Caracas and associated risk factors]. *Rev Panam Salud Publica*. 2003;13:117–23. [Medline DOI: 10.1590/S1020-49892003000200012](#)
16. Abbaszadegan MR, Gholamin M, Tabatabaee A, Farid R, Houshmand M, Abbaszadegan M. Prevalence of human T-lymphotropic virus type 1 among blood donors from Mashhad, Iran. *J Clin Microbiol*. 2003;41:2593–5. [Medline DOI: 10.1128/JCM.41.6.2593-2595.2003](#)
17. Taha MA, Bashawri LA, Ahmed MS, Ahmed MA. Prevalence of antibodies to human T-lymphotropic viruses types I and II among healthy blood donors. *Saudi Med J*. 2003;24:637–40. [Medline](#)
18. Naman R, Klayme S, Naboulsi M, Mokhbat J, Jradi O, Ramia S. HTLV-I and HTLV-II infections in volunteer blood donors and high-risk groups in Lebanon. *J Infect*. 2002;45:29–31. [Medline DOI: 10.1053/jinf.2002.1006](#)
19. Senyuta N, Syrtsev A, Yamashita M, Stepina V, Susova O, Scherbak L, et al. Sero-epidemiologic and phylogenetic studies of HTLV-I infection in 2 countries of the Caspian Sea region. *Int J Cancer*. 1998;77:488–93. [Medline DOI: 10.1002/\(SICI\)1097-0215\(19980812\)77:4<488::AID-IJC2>3.0.CO;2-Q](#)
20. Constantine NT, Fathi Sheba M, Corwin AL, Danahy RS, Callahan JD, Watts DM. A serosurvey for HTLV-I among high-risk populations and normal adults in Egypt. *Epidemiol Infect*. 1991;107:429–33. [Medline DOI: 10.1017/S0950268800049074](#)
21. Mojaat N, Kaabi H, Hmida S, Maamar M, Slama S, Boukef K. Seroprevalence of HTLV-I/II antibodies in blood donors and different groups at risk in Tunisia. *J Acquir Immune Defic Syndr*. 1999;22:314–5. [Medline](#)
22. Collenberg E, Ouedraogo T, Ganame J, Fickenscher H, Kynast-Wolf G, Becher H, et al. Seroprevalence of six different viruses among pregnant women and blood donors in rural and urban Burkina Faso: A comparative analysis. *J Med Virol*. 2006;78:683–92. [Medline DOI: 10.1002/jmv.20593](#)

23. Diop S, Calattini S, Abah-Dakou J, Thiam D, Diakhate L, Gessain A. Seroprevalence and molecular epidemiology of human T-Cell leukemia virus type 1 (HTLV-1) and HTLV-2 in blood donors from Dakar, Senegal. *J Clin Microbiol.* 2006;44:1550–4. [Medline DOI: 10.1128/JCM.44.4.1550-1554.2006](#)
24. Kumar H, Gupta PK. Is seroprevalence of HTLV-I/II among blood donors in India relevant? *Indian J Pathol Microbiol.* 2006;49:532–4. [Medline](#)