

Supplementary File 1

Colorectal cancer epidemiological data collected from the Global Cancer Observatory: Cancer Today

Country	Incidence			Mortality			Prevalence
	Number of incident cases	Crude rate	ASR (World) per 100 000	Number of deaths	Crude rate	ASR (World) per 100 000	Number of prevalent cases
Zambia	449	2.4	5.6	311	1.7	4	888
Uganda	1185	2.6	6.7	859	1.9	5	2090
Senegal	594	3.5	6.7	431	2.6	5.1	1011
Cameroun	915	3.4	7.1	635	2.4	5.2	1699
Zimbabwe	651	4.4	8.9	459	3.1	6.4	1233
Mali	881	4.4	9.2	683	3.4	7.5	1240
Oman	385	7.5	9.9	213	4.2	5.7	1028
Kenya	2724	5.1	10.5	1862	3.5	7.5	5197
Morocco	4558	12.3	11.3	2499	6.8	6.2	10321
Tunisia	1865	15.8	12.7	965	8.2	6.4	4618
K.Saudi Arabia	4007	11.5	13.9	1996	5.7	7.3	11160
R. South Africa	7354	12.4	14.6	3728	6.3	7.5	17337
China	555477	38.4	23.9	286162	19.8	12	1416426
Finland	3780	68.2	25.7	1489	28.9	8.8	11829
Germany	57528	68.7	25.8	27077	32.3	9.9	181954
Italy	48576	80.3	29.3	21789	36	10.1	143470
France	48061	73.6	30.1	20953	32.1	10.4	144431
England	52128	76.8	34.1	21682	31.9	11.4	161362
Belgium	9585	82.7	35.2	3349	28.9	10	29536
Japan	148505	117.4	38.5	59912	47.4	11.6	457672
Portugal	10501	103	39.4	4320	42.4	13	30326

Supplementary File 2

HLA-A and -B allele frequencies per country collected from Allele Frequency.net

Morocco (Atlantic Coast Chaouya)				Tunisia				Senegal (Niokholo Mandenka)				Cameroon (Bamileke)				MALI (Bandiagara)				
n=98				n=100				n=165				(n=77)				(n=138)				
Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	
A*02:01:01	0.162	B*50:01	0.11	A*02:01	0.18	B*50:01	0.1	A*23:01	0.177	B*35:01	0.122	A*23:01	0.149	B*58:02	0.143	A*23:01	0.228	B*53:01	0.16	
A*01:01:01	0.128	B*44:03:01	0.068	A*01:01	0.11	B*51:01	0.072	A*30:02	0.124	B*44:10	0.074	A*02:02	0.104	B*53:01	0.084	A*30:01	0.141	B*42:01	0.14	
A*23:01	0.074	B*45:01	0.068	A*23:01	0.09	B*18:01	0.067	A*02:02	0.091	B*15:03	0.069	A*29:02	0.084	B*44:03	0.084	A*33:03	0.094	B*35:01	0.13	
A*29:02	0.068	B*08:01	0.062	A*03:01	0.07	B*35:01	0.048	A*02:01	0.081	B*58:01	0.069	A*03:01	0.078	B*07:02	0.071	A*02:01	0.083	B*52:01	0.08	
A*30:01	0.068	B*14:02	0.041	A*24:02	0.07	B*08:01	0.046	A*33:03	0.081	B*07:02	0.058	A*30:02	0.071	B*45:01	0.06	A*02:02	0.076	B*15:03	0.07	
A*03:01:01	0.047	B*18:01	0.041	A*29:02	0.07	B*14:02	0.04	A*68:01	0.07	B*53:01	0.053	A*33:03	0.045	B*58:01	0.052	A*68:02	0.062	B*78:01	0.07	
A*68:02:01	0.047	B*51:01:01	0.041	A*33:01	0.06	B*45:01	0.04	A*26:01	0.043	B*78:01	0.053	A*66:01	0.045	B*15:03	0.045	A*34:02	0.036	B*45:01	0.06	
A*24:02	0.041	B*07:02:01	0.034	A*30:02	0.06	B*58:01	0.04	A*03:01	0.038	B*08:01	0.048	A*68:02	0.045	B*14:03	0.039	A*68:01	0.036	B*07:02	0.06	
A*30:02	0.041	B*35:01:01	0.034	A*11:01	0.05	B*49:01	0.035	A*29:02	0.038	B*49:01	0.037	A*74:01	0.045	B*42:01	0.039	A*74:01	0.036	B*51:01	0.03	
A*11:01:01	0.034	B*44:02	0.034	A*30:01	0.04	B*38:01	0.03	A*30:01	0.038	B*52:01:02	0.037	A*30:01	0.032	B*35:01	0.039	A*30:02	0.034	B*49:01	0.03	
A*32:01	0.034	B*49:01	0.034	A*68:01	0.04	B*57:01	0.03	A*80:01	0.038	B*15:10	0.032	A*01:01	0.026	B*15:16	0.032	A*29:02	0.033	B*15:10	0.02	
A*26:01	0.027	B*58:01	0.034	A*02:05	0.03	B*52:01	0.025	A*01:01	0.027	B*07:05	0.027	A*02:05	0.026	B*51:01	0.032	A*02:05	0.022	B*58:01	0.02	
A*68:01:01	0.027	B*15:17	0.027	A*68:02	0.03	B*07:05	0.02	A*33:01	0.027	B*14:02	0.027	A*26:12	0.026	B*57:03	0.032	A*33:01	0.018	B*44:03	0.02	
A*80:01	0.027	B*42:01	0.027	A*31:01:02	0.02	B*15:03	0.02	A*34:02	0.022	B*18:01	0.027	A*34:02	0.026	B*47:01	0.026	A*80:01	0.015	B*14:01	0.01	
A*31:01:02	0.02	B*57:01:01	0.027	A*32:01	0.02	B*53:01	0.02	A*74:01	0.022	B*45:01	0.027	A*36:01	0.026	B*47:03	0.019	A*01:02	0.011	B*14:02	0.01	
A*33:01	0.02	B*13:02	0.021	A*36:01	0.02	B*07:02	0.015	A*01:02	0.016	B*56:01	0.027	A*80:01	0.019	B*49:01	0.019	A*01:01	0.007	B*15:16	0.01	
A*02:05	0.014	B*35:08	0.021	A*01:02	0.01	B*13:02	0.015	A*68:02	0.016	B*39:10	0.021	A*68:01	0.013	B*13:02	0.019	A*32:01	0.007	B*50:01	0.01	
A*25:01	0.014	B*39:01	0.021	A*02:02	0.01	B*41:02	0.015	A*02:05	0.011	B*27:03	0.016	A*02:01	0.011	B*07:05	0.013	A*02:17	0.004	B*57:02	0.01	
A*30:04	0.014	B*41:01	0.021	A*26:01	0.01	B*42:01	0.015	A*32:01	0.011	B*42:02	0.016	A*26:01	0.006	B*14:01	0.013	A*02:17	0.004	B*08:01	0.01	
A*33:03	0.014	B*53:01	0.021	A*30:04	0.01	B*15:10	0.01	A*02:06	0.005	B*47:01	0.016	A*30:04	0.006	B*15:10	0.013	A*03:01	0.044	B*18:01	0.01	
A*34:02	0.014	B*07:06	0.014	A*80:01	0.01	B*41:01	0.01	A*24:02	0.005	B*50:01	0.016	A*66:02	0.006	B*18:01	0.013	A*24:06	0.004	B*39:10	0.01	
A*66:01	0.014	B*15:10	0.014	A*03:02	0.01	B*51:08	0.01	A*30:08	0.005	B*51:01:01	0.016			B*42:02	0.013	A*24:13	0.004	B*41:02	0.01	
A*69:01	0.014	B*35:02	0.014	A*25:01	0.01	B*58:02	0.01	A*31:01:02	0.005	B*51:07	0.016			B*44:07	0.013			B*56:01	0.01	
A*01:02	0.007	B*39:10	0.014	A*25:02	0.01	B*07:10	0.005	A*66:02	0.005	B*57:02	0.016			B*81:01	0.013			B*57:03	0.01	
A*02:02	0.007	B*40:01	0.014	A*29:01	0.01	B*13:03	0.005	A*68:04	0.005	B*15:18	0.011			B*08:01	0.006			B*13:02	0	
A*03:02	0.007	B*40:02	0.014	A*33:03	0.01	B*15:09	0.005			B*37:01	0.011			B*14:02	0.006			B*15:17	0	
A*30:10	0.007	B*41:02	0.014	A*34:02	0.01	B*15:16	0.005			B*41:02	0.011			B*39:10	0.006			B*15:18	0	
A*68:01:02	0.007	B*50:02	0.014	A*66:01	0.01	B*35:02	0.005			B*08:04	0.005			B*40:16	0.006			B*27:03	0	
A*74:01	0.007	B*57:03:01	0.014	A*69:01	0.01	B*35:03	0.005			B*35:28	0.005			B*27:05	0.006					
		B*14:01	0.007			B*39:06:02	0.005			B*39:02	0.005			B*50:01	0.006					
		B*14:03	0.007			B*56:01	0.005			B*42:01	0.005			B*73:01	0.006					

Supplementary File 2 (continued)

KENYA				South Africa (Natal Zulu)				UGANDA (Kampala pop 2)				Zambia (Lusaka)				Zimbabwe (Harare Shona)			
(n=144)				n=100				(n= 175)				(n= 44)				(n= 230)			
Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq		
A*68:02	0.105	B*53:01	0.087	A*29:02	0.11	B*42:01	0.12	A*02:01	0.114	B*45:01	0.109	A*30:02	0.233	B*42:01	0.148	A*30:02	0.147	B*45:01	0.093
A*74:01	0.094	B*58:01	0.08	A*23:01	0.1	B*44:03	0.105	A*74:01	0.094	B*53:01	0.106	A*30:01	0.14	B*53:01	0.102	A*23:01	0.127	B*53:01	0.093
A*02:01:01	0.084	B*42:01	0.073	A*30:01	0.095	B*15:03	0.095	A*23:01	0.091	B*58:02	0.103	A*02:01	0.128	B*15:03	0.057	A*68:02	0.098	B*15:10	0.084
A*30:01	0.084	B*15:03	0.063	A*68:02	0.095	B*15:10	0.085	A*30:02	0.083	B*15:03	0.086	A*23:01	0.081	B*51:01	0.057	A*29:02	0.096	B*15:03	0.077
A*30:02	0.073	B*18:01	0.059	A*30:02	0.085	B*58:02	0.085	A*01:01	0.066	B*42:01	0.063	A*03:01	0.058	B*57:03	0.057	A*02:01	0.091	B*42:01	0.069
A*36:01	0.07	B*57:03:01	0.056	A*03:01	0.06	B*08:01	0.075	A*66:01	0.066	B*58:01	0.06	A*29:02	0.058	B*07:02	0.046	A*30:01	0.091	B*58:02	0.064
A*03:01:01	0.052	B*15:10	0.052	A*02:05	0.055	B*07:02	0.045	A*68:02	0.066	B*49:01	0.054	A*68:02	0.047	B*14:01	0.046	A*03:01	0.04	B*18:01	0.064
A*02:02	0.049	B*45:01	0.052	A*34:02	0.055	B*14:01	0.04	A*30:01	0.063	B*15:10	0.051	A*31:01:02	0.035	B*15:10	0.046	A*66:01	0.038	B*44:03	0.058
A*29:02	0.049	B*49:01	0.038	A*01:01	0.04	B*35:01	0.04	A*29:02	0.051	B*07:02	0.046	A*36:01	0.035	B*45:01	0.046	A*02:02	0.036	B*07:02	0.046
A*23:01	0.045	B*07:02:01	0.035	A*02:02	0.035	B*57:03	0.04	A*03:01	0.043	B*08:01	0.043	A*02:02	0.023	B*08:01	0.034	A*34:02	0.033	B*57:03	0.044
A*01:01	0.031	B*08:01	0.031	A*43:01	0.03	B*58:01	0.04	A*02:02	0.037	B*81:01	0.04	A*74:01	0.023	B*14:02	0.034	A*02:05	0.031	B*58:01	0.044
A*34:02	0.028	B*47:03	0.031	A*02:01	0.025	B*45:01	0.035	A*36:01	0.029	B*14:02	0.031	A*80:01	0.023	B*18:01	0.034	A*36:01	0.029	B*81:01	0.04
A*31:04	0.024	B*81:01	0.028	A*32:01	0.025	B*81:01	0.035	A*02:14	0.02	B*57:03	0.029	A*02:06	0.012	B*15:01	0.023	A*74:01	0.027	B*08:01	0.031
A*24:02:01:01	0.021	B*35:01:01	0.024	A*66:01	0.02	B*14:02	0.025	A*34:02	0.02	B*13:02	0.017	A*02:14	0.012	B*35:01	0.023	A*26:01	0.016	B*14:02	0.024
A*29:01	0.021	B*13:02	0.021	A*29:01	0.015	B*07:05	0.02	A*68:01	0.02	B*18:01	0.017	A*26:01	0.012	B*40:01	0.023	A*30:04	0.011	B*44:03:01	0.013
A*66:01	0.017	B*51:01:01	0.017	A*30:04	0.015	B*18:01	0.02	A*02:05	0.014	B*44:15	0.017	A*33:01	0.012	B*41:02	0.023	A*32:01	0.009	B*08:05	0.013
A*24:23	0.017	B*27:03	0.014	A*66:02	0.015	B*13:02	0.015	A*29:01	0.014	B*18:03	0.011	A*34:02	0.012	B*44:03	0.023	A*68:01	0.009	B*14:01	0.013
A*02:05	0.014	B*44:03:01	0.014	A*26:01	0.01	B*39:10	0.015	A*33:03	0.014	B*35:01	0.011	A*43:01	0.012	B*57:02	0.023	A*31:03	0.007	B*15:16	0.013
A*68:01:01	0.014	B*57:02	0.014	A*33:03	0.005	B*53:01	0.015	A*30:04	0.011	B*41:01	0.011	A*66:01	0.012	B*58:02	0.023	A*01:01	0.004	B*35:01	0.013
A*32:01	0.01	B*41:01	0.014	A*01:02	0	B*49:01	0.01	A*24:02	0.009	B*57:02	0.011			B*81:01	0.023	A*24:02	0.004	B*42:02	0.011
A*01:03	0.007	B*53:05	0.014	A*02:03	0	B*57:02	0.01	A*26:01	0.009	B*40:12	0.009			B*07:05	0.011	A*29:01	0.004	B*49:01	0.009
A*02:04	0.007	B*07:07	0.007	A*02:04	0	B*15:01	0.005	A*31:01	0.009	B*51:01	0.009			B*13:02	0.011	A*32:03	0.004	B*49:01	0.009
A*02:34	0.007	B*14:02	0.007	A*02:06	0	B*15:16	0.005	A*31:04	0.009	B*82:02	0.009			B*15:18	0.011	A*43:01	0.004	B*50:01	0.007
A*29:03	0.007	B*14:06:02	0.007	A*02:07	0	B*41:01	0.005	A*32:01	0.009	B*37:01	0.006			B*18:03	0.011	A*68:01:01	0.004	B*57:02	0.007
A*33:01	0.007	B*15:16	0.007	A*02:08	0	B*41:02	0.005	A*01:02	0.006	B*44:03	0.006			B*41:01	0.011	A*33:03	0.024	B*15:37	0.004
A*34:01	0.007	B*39:10	0.007	A*02:09	0	B*67:01	0.005	A*30:09	0.006	B*47:03	0.006			B*44:05	0.011	A*02:17	0.002	B*35:20	0.004
A*01:06	0.003	B*58:02	0.07	A*02:10	0	B*82:01	0.005	A*66:02	0.006	B*07:05	0.003			B*47:01	0.011	A*32:02	0.002	B*41:01	0.004
A*02:01:02	0.003	B*82:02	0.007	A*02:11	0	B*07:03	0	A*74:03	0.006	B*13:03	0.003			B*49:01	0.011	A*34:01	0.002	B*51:01	0.004
A*02:14	0.003	B*07:17	0.003	A*02:12	0	B*07:04	0	A*01:03	0.003	B*14:01	0.003			B*57:01	0.011	A*66:02	0.002	B*57:01	0.004
A*02:24	0.003	B*13:01	0.003					A*01:09	0.003	B*15:16	0.003					A*66:03	0.002	B*07:12	0.002
A*02:26	0.003	B*15:17	0.003					A*01:23	0.003	B*15:31	0.003					A*80:01	0.002	B*13:02	0.022
A*02:36	0.003	B*15:55	0.003					A*66:03	0.003	B*15:37	0.003							B*13:04	0.002
A*26:05	0.003	B*15:67	0.003							B*35:02	0.003							B*14:04	0.002
A*26:09	0.003	B*18:07	0.003							B*35:03	0.003							B*15:17	0.002
A*26:12	0.003	B*35:34	0.003							B*39:10	0.003							B*15:18	0.002
A*30:04	0.003	B*41:02	0.003							B*39:24	0.003							B*39:10	0.002

Supplementary File 2 (continued)

Oman				Saudi Arabia (pop 2)				Japan (Central)				China (Marrow Donor Registry)				Portugal (Center)			
n=118				n= 383				n=371				n = 600				n=50			
Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq
A*02:01	0.216	B*51:01	0.178	A*02:01:01	0.202	B*51:01:01	0.19	A*24:02	0.379	B*52:01	0.107	A*11:01	0.27	B*40:01	0.155	A*02:01	0.26	B*51:01	0.12
A*11:01	0.114	B*08:01	0.11	A*24:02:01	0.075	B*50:01:01	0.12	A*02:01	0.115	B*15:01	0.087	A*24:02	0.15	B*46:01	0.138	A*01:01	0.13	B*44:03	0.11
A*32:01	0.114	B*40:06	0.089	A*01:01:01	0.071	B*08:01:01	0.07	A*33:03	0.097	B*44:03	0.087	A*02:07	0.12	B*58:01	0.062	A*03:01	0.09	B*18:01	0.08
A*26:01	0.102	B*35:01	0.076	A*68:01:01	0.063	B*07:02:01	0.05	A*11:01	0.082	B*40:02	0.086	A*02:01	0.11	B*13:01	0.059	A*24:02	0.08	B*07:02	0.07
A*01:01	0.072	B*58:01	0.068	A*03:01:01	0.059	B*53:01:01	0.04	A*26:01	0.081	B*51:01	0.077	A*33:03	0.08	B*51:01	0.052	A*29:02	0.07	B*35:02	0.07
A*24:02:01:01	0.059	B*35:08	0.059	A*26:01:01	0.053	B*41:01	0.03	A*02:06	0.077	B*54:01	0.077	A*02:03	0.05	B*15:02	0.05	A*68:01	0.06	B*15:01	0.06
A*03:01	0.051	B*15:03	0.047	A*31:01:02	0.053	B*58:01:01	0.03	A*31:01:02	0.071	B*35:01	0.076	A*30:01	0.04	B*13:02	0.047	A*11:01	0.05	B*35:01	0.05
A*30:02	0.042	B*18:01	0.047	A*23:01:01	0.045	B*35:01:01	0.03	A*26:03	0.024	B*07:02	0.065	A*02:06	0.04	B*15:01	0.045	A*31:01:02	0.04	B*44:02	0.05
A*68:01:01	0.03	B*52:01	0.038	A*02:05:01	0.044	B*18:01:01	0.03	A*26:02	0.023	B*39:01	0.044	A*31:01	0.03	B*54:01	0.036	A*32:01	0.04	B*45:01	0.05
A*31:01:02	0.025	B*50:01	0.03	A*32:01:01	0.041	B*52:01	0.02	A*02:07	0.022	B*40:01	0.042	A*26:01	0.02	B*55:02	0.035	A*33:01	0.03	B*08:01	0.04
A*02:05	0.021	B*39:06	0.025	A*33:03:01	0.036	B*49:01:01	0.03	A*01:01	0.009	B*40:06	0.039	A*01:01	0.02	B*38:02	0.032	A*03:02	0.02	B*14:02	0.04
A*33:03	0.021	B*53:01	0.021	A*11:01:01	0.035	B*14:02	0.02	A*02:10	0.007	B*46:01	0.036	A*11:02	0.02	B*35:01	0.026	A*30:01	0.02	B*57:01	0.03
A*23:01	0.017	B*14:02	0.021	A*30:02:01	0.032	B*15:17:01	0.02	A*03:01	0.004	B*48:01	0.03	A*03:01	0.01	B*52:01	0.022	A*30:02	0.02	B*18:05	0.02
A*68:02	0.017	B*07:02	0.017	A*30:01:01	0.026	B*35:03:01	0.02	A*02:18	0.001	B*55:02	0.019	A*32:01	0.01	B*39:01	0.018	A*66:01	0.02	B*35:03	0.02
A*03:02	0.013	B*55:01	0.017	A*68:02:01	0.017	B*35:08	0.02	A*03:02	0.001	B*59:01	0.018	A*29:01	0.01	B*40:02	0.018	A*02:05	0.01	B*37:01	0.02
A*30:04	0.013	B*42:01	0.013	A*29:01:01	0.016	B*13:02:01	0.02	A*11:02	0.001			A*24:07	0.01	B*51:02	0.018	A*02:20	0.01	B*40:01	0.02
A*33:01	0.013	B*44:03	0.013			B*38:01	0.02	A*24:04	0.001			A*68:01	0	B*40:06	0.015	A*23:01	0.01	B*58:01	0.02
A*68:01:02	0.013	B*45:01	0.013			B*07:05:01	0.01	A*26:04	0.001			A*02:05	0	B*44:03	0.013	A*26:01	0.01	B*07:05	0.01
A*29:02	0.008	B*57:01	0.013			B*15:03:01	0.01	A*26:05	0.001			A*03:02	0	B*15:11	0.012	A*29:01	0.01	B*13:02	0.01
A*66:01	0.008	B*81:01	0.013			B*35:02:01	0.01	A*30:01	0.001			A*24:20	0	B*15:18	0.012	A*68:02	0.01	B*15:17	0.01
A*02:02	0.004	B*39:24	0.008			B*37:01:01	0.01					A*69:01	0	B*48:01	0.012	A*69:01	0.01	B*15:18	0.01
A*02:08	0.004	B*41:01	0.008			B*44:02:01	0.01					A*11:03	0	B*57:01	0.008			B*27:05	0.01
A*02:14	0.004	B*58:02	0.008			B*44:03:01	0.01					A*24:08	0	B*56:01	0.007			B*39:06	0.01
A*24:02:01:02L	0.004	B*73:01	0.008									A*24:10	0	B*07:02	0.006			B*40:02	0.01
A*29:01	0.004	B*07:05	0.004									A*24:68	0	B*07:05	0.006			B*42:01	0.01
A*36:01	0.004	B*14:01	0.004									A*33:01	0	B*15:27	0.006			B*47:01	0.01
		B*15:13	0.004									A*34:01	0	B*27:04	0.006			B*49:01	0.01
		B*15:16	0.004									A*74:02	0	B*27:05	0.006			B*52:01	0.01
		B*15:17	0.004											B*35:05	0.006			B*53:01	0.01
		B*27:02	0.004											B*15:25	0.005			B*55:01	0.01
		B*35:03	0.004											B*37:01	0.005				
		B*37:01	0.004											B*44:02	0.005				
		B*38:01	0.004											B*50:01	0.005				
		B*39:10	0.004											B*35:03	0.004				
		B*44:15	0.004											B*08:01	0.003				
		B*47:01	0.004											B*15:05	0.003				

Supplementary File 2 (continued)

France (French BM Donor Registry) n=42623				Italy (pop 5) n = 975				Belgium n=99				England (Blood Donors of Mixed Ethnicity) n=519				Germany (pop 8) n=39689				
Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq	0.137	Allele	Freq	Allele	Freq	Allele	Freq	Allele	Freq
A*02:01	0.29	B*07:02	0.114	A*02:01	0.241	B*35:01	0.087	A*02:01	0.266	B*07	0.137	0.126	A*02:01:01	0.3035	B*08:01:01	0.1339	A*02:01	0.267	B*07:02	0.12
A*01:01	0.13	B*08:01	0.095	A*24:02	0.122	B*51:01	0.08	A*03:01	0.171	B*08:01	0.126	0.079	A*01:01:01	0.2062	B*07:02:01	0.1329	A*01:01	0.151	B*08:01	0.095
A*03:01	0.123	B*44:03	0.08	A*01:01	0.102	B*18:01	0.058	A*01:01	0.155	B*35	0.079	0.071	A*03:01:01	0.132	B*44:02:01	0.1098	A*03:01	0.147	B*44:02	0.073
A*24:02	0.094	B*44:02	0.077	A*03:01	0.102	B*14:02	0.057	A*24:02	0.066	B*27:05	0.071	0.061	A*24:02:01	0.0645	B*15:01:01	0.0684	A*24:02	0.095	B*15:02	0.065
A*29:02	0.057	B*51:01	0.074	A*11:01	0.046	B*49:01	0.043	A*24:02	0.066	B*15	0.061	0.061	A*11:01:01	0.0578	B*40:01:02	0.0578	A*11:01	0.056	B*51:01	0.063
A*11:01	0.05	B*18:01	0.058	A*26:01	0.041	B*08:01	0.041	A*68:01	0.057	B*40:01	0.061	0.06	A*32:01:01	0.0356	B*44:03:01	0.0549	A*26:01	0.036	B*35:01	0.062
A*32:01	0.034	B*15:01	0.054	A*32:01	0.037	B*07:02	0.04	A*11:01	0.047	B*44:02	0.06	0.051	A*29:02:01	0.0308	B*35:01:01	0.0491	A*32:01	0.036	B*18:01	0.05
A*26:01	0.03	B*35:01	0.046	A*30:01	0.034	B*35:03	0.038	A*31:01	0.042	B*18:01	0.051	0.051	A*31:01:02	0.0299	B*57:01:01	0.0462	A*68:01	0.035	B*40:01	0.049
A*23:01	0.027	B*40:01	0.036	A*68:01	0.033	B*15:01	0.035	A*29:02	0.037	B*51	0.051	0.036	A*23:01:01	0.0231	B*51:01:01	0.0424	A*25:01	0.024	B*44:03	0.041
A*31:01	0.027	B*14:02	0.031	A*31:01	0.026	B*35:02	0.033	A*32:01	0.037	B*44:03	0.036	0.031	A*26:01:01	0.0193	B*27:05:02	0.0376	A*29:02	0.024	B*13:02	0.035
A*68:01	0.024	B*27:05	0.029	A*02:05	0.023	B*44:02	0.033	A*26	0.021	B*37	0.031	0.026	A*68:01:02	0.0193	B*18:01:01	0.027	A*23:01	0.023	B*27:05	0.034
A*30:02	0.018	B*57:01	0.029	A*23:01	0.022	B*78:01	0.031	A*23:01	0.016	B*40:02	0.026	0.02	A*30:01:01	0.0116	B*14:02:01	0.026	A*31:01	0.023	B*57:01	0.031
A*25:01	0.016	B*49:01	0.023	A*29:02	0.021	B*15:17	0.03	A*30:02	0.016	B*55	0.02	0.02	A*68:02:01	0.0087	B*55:01:01	0.025	A*30:01	0.016	B*35:03	0.025
A*30:01	0.012	B*13:02	0.02	A*30:02	0.02	B*38:01	0.029	A*02:02	0.005	B*57:01	0.02	0.015	A*25:01:01	0.0077	B*13:02:01	0.0231	A*02:05	0.0093	B*38:01	0.025
A*33:01	0.011	B*35:03	0.02	A*33:01	0.02	B*44:03	0.027	A*02:05	0.005	B*13:02	0.015	0.015	A*68:01:01	0.0077	B*37:01:01	0.0212	A*33:01	0.0081	B*14:02	0.02
A*02:05	0.0094	B*38:01	0.019	A*25:01	0.017	B*57:01	0.024	A*30:01	0.005	B*38	0.015	0.015	A*02:05:01	0.0067	B*49:01:01	0.0145	A*68:02	0.0072	B*40:02	0.016
A*68:02	0.009	B*55:01	0.016	A*03:02	0.015	B*35:08	0.022	A*33:01	0.005	B*39	0.015	0.01	A*30:02:01	0.0067	B*40:02:01	0.0135	A*30:02	0.0055	B*49:01	0.016
A*01:02	0.0073	B*40:02	0.015	A*24:03	0.012	B*50:01	0.022	A*66:01	0.005	B*14:02	0.01	0.01	A*33:01:01	0.0048	B*14:01:01	0.0116	A*33:03	0.0053	B*55:01	0.015
A*11:02	0.005	B*50:01	0.013	A*66:01	0.008	B*13:02	0.021	A*68:02	0.005	B*41	0.01	0.01	A*02:11:01	0.0039	B*52:01:01	0.0096	A*29:01	0.0041	B*39:01	0.014
A*66:01	0.0034	B*37:01	0.012	A*30:04	0.007	B*40:02	0.018	A*25:01	0.01	B*44:07	0.01	0.01	A*02:06:01	0.0029	B*38:01:01	0.0087	A*03:02	0.0039	B*37:01	0.013
A*29:01	0.0028	B*14:01	0.011	A*68:02	0.007	B*40:01	0.017	A*33:03	0.01	B*49:01	0.01	0.01	A*33:03:01	0.0029	B*39:06:02	0.0087	A*24:03	0.0026	B*50:01	0.013
A*33:03	0.0026	B*39:01	0.011	A*02:17	0.006	B*27:05	0.016			B*50:01	0.01	0.015	A*66:01:01	0.0029	B*58:01:01	0.0087	A*02:06	0.0021	B*52:01	0.011
A*03:02	0.0021	B*58:01	0.01	A*33:03	0.006	B*39:01	0.016			B*45:01	0.015	0.015	A*30:04:01	0.0019	B*39:01:01	0.0077	A*30:04	0.0016	B*35:02	0.01
		B*35:02	0.0093	A*29:01	0.005	B*58:01	0.016			B*52:01	0.015	0.005	A*02:03:01	0.001	B*15:17:01	0.0058	A*02:17	0.0013	B*58:01	0.0090
		B*53:01	0.0091	A*02:02	0.004	B*55:01	0.013			B*14:01	0.005	0.005	A*02:07:01	0.001	B*35:03:01	0.0048	A*26:08	0.0009	B*56:01	0.0087
				A*69:01	0.004	B*14:01	0.012			B*18:03	0.005	0.005	A*02:13	0.001	B*45:01:01	0.0048	A*69:01	0.0009	B*27:05	0.0072
				A*01:02	0.003	B*37:01	0.012			B*27:02	0.005	0.005	A*03:02:01	0.001	B*50:01:01	0.0039	A*02:02	0.0008	B*35:06	0.0070
				A*02:06	0.003	B*52:01	0.012			B*44:04	0.005	0.005	A*24:03:01	0.001	B*53:01:01	0.0039	A*02:30	0.0005	B*44:03	0.0062
				A*03:05	0.003	B*41:01	0.01			B*56	0.005	0.005	A*24:07:01	0.001	B*35:08:01	0.0029	A*34:02	0.0005	B*41:02	0.0062

Supplementary File 2 (continued)

Finland			
(n=91)			
Allele	Freq	Allele	Freq
A*02:01	0.344	B*07:02:01	0.144
A*03:01	0.25	B*15:01:01	0.122
A*24:02	0.094	B*35:01	0.117
A*01:01	0.089	B*40:01	0.094
A*11:01	0.05	B*08:01	0.089
A*31:01:02	0.05	B*18:01	0.078
A*68:01:02	0.039	B*27:05	0.061
A*32:01	0.022	B*51:01:01	0.056
A*25:01	0.011	B*44:02	0.044
A*26:01	0.011	B*13:02	0.017
A*29:01	0.011	B*27:02	0.017
A*23:01	0.006	B*40:02	0.017
A*30:01	0.006	B*41:01	0.017
A*30:02	0.006	B*44:03	0.017
A*68:01:01	0.006	B*56:01	0.017
A*68:06	0.006	B*57:01	0.017
		B*35:08:01	0.011
		B*38:01:01	0.011
		B*39:01	0.011
		B*39:06	0.011
		B*55:01	0.011
		B*27:04	0.006
		B*39:03	0.006
		B*47:01	0.006

Supplementary File 3

Number of epitope hits / HLA combinations recognized and Cumulative percent of population coverage in the studied populations

Country	Morocco		Tunisia	Senegal	Cameroun	Mali	Kenya	Zambia	Zimbabwe	South Africa	Uganda	Belgium	Italy	France	England	Portugal	China	Japan	Oman	Saudi Arabia	Germany	Finlande																			
	Number of epitope hits / HLA combinations recognized	Cumulative percent of population coverage																																							
	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100																	
1	99.11	1	98.65	1	98.47	1	98.35	1	97.7	1	98.62	1	99.24	1	99.39	1	98.28	1	99.28	1	99.09	1	99.11	1	99.39	1	99.53	1	98.28	1	97.19	1	94.07	1	99.52	1	98.7	1	99.44	1	99.68
2	98.65	2	97.68	2	98.1	2	98.12	2	97.45	2	98.47	2	98.8	2	99.38	2	98.01	2	99.07	2	98.38	2	98.72	2	98.97	2	99.27	2	97.44	2	96.46	2	91.78	2	99.24	2	97.18	2	99.19	2	99.39
3	96.47	3	93.94	3	93.51	3	94.01	3	91.4	3	94.97	3	96.55	3	97.41	3	94.81	3	96.82	3	91.09	3	95.42	3	96.07	3	94.79	3	91.99	3	91.25	3	83.51	3	96.14	3	92.18	3	94.88	3	95.18
4	95.5	4	92.26	4	92.31	4	92.69	4	89.04	4	93.73	4	95.45	4	96.63	4	94.1	4	95.89	4	89.62	4	93.88	4	95.23	4	94.07	4	90.09	4	89.36	4	81.34	4	95.3	4	89.68	4	94.09	4	94.16
5	92.83	5	87.63	5	84.92	5	86.07	5	81.61	5	87.85	5	89.37	5	92.42	5	88.56	5	91.81	5	87.27	5	90.18	5	92.7	5	92.27	5	85.6	5	85.2	5	75.45	5	91.78	5	86.34	5	91.13	5	90.74
6	86.92	6	79.97	6	79.38	6	80.6	6	72.17	6	82.65	6	83.63	6	88.93	6	82.68	6	87.51	6	76.45	6	82.5	6	86.93	6	85.52	6	77.37	6	73.57	6	62.92	6	86.7	6	78.34	6	84.92	6	84.3
7	82.83	7	73.32	7	71.1	7	72.93	7	65.67	7	75.61	7	76.24	7	83	7	76.62	7	81.84	7	70.75	7	78.21	7	82.12	7	81.1	7	71.25	7	68.34	7	55.89	7	81.08	7	71.73	7	80.22	7	79.34
8	74.27	8	63.49	8	61.32	8	63.84	8	53.03	8	67.14	8	67.29	8	75.42	8	68.05	8	74.2	8	53.19	8	67.52	8	72.67	8	67.4	8	59.01	8	56.88	8	41.92	8	71.65	8	58.75	8	67.37	8	65.83
9	69.9	9	57.41	9	54.16	9	56.22	9	45.7	9	59.21	9	59.17	9	68.07	9	62.29	9	67.47	9	50.22	9	60.94	9	68.5	9	64.49	9	53.78	9	50.62	9	38.26	9	66.46	9	53.29	9	63.73	9	61.46
10	61.25	10	46.92	10	42.54	10	45.48	10	34.72	10	48.81	10	46.12	10	57.3	10	51.08	10	57.35	10	43.29	10	51.42	10	59.49	10	57	10	44.71	10	42.32	10	30.82	10	55.64	10	45.98	10	54.42	10	51.2
11	50.23	11	36.96	11	35.17	11	37.4	11	26.08	11	40.21	11	37.59	11	48.94	11	42.73	11	48.46	11	28.5	11	39.99	11	48.99	11	44.55	11	34.78	11	30.93	11	23.27	11	46.65	11	35.21	11	43.77	11	40.36
12	42.72	12	29.16	12	26.14	12	28.49	12	19.76	12	31.26	12	28.46	12	38.65	12	33.81	12	39.04	12	24.12	12	33.6	12	40.87	12	37.19	12	27.82	12	24.21	12	18.17	12	37.81	12	28.34	12	35.84	12	32.12
13	32.81	13	21.4	13	19.35	13	21.47	13	12.84	13	23.78	13	20.33	13	30.06	13	26.27	13	30.54	13	14.56	13	23.83	13	31.05	13	25.35	13	19.18	13	16.78	13	10.68	13	28.17	13	18.49	13	24.86	13	21.31
14	27.81	14	16.44	14	14.15	14	15.58	14	9.18	14	17.24	14	14.25	14	22.2	14	20.28	14	23.24	14	12.47	14	18.45	14	25.86	14	21.99	14	15.46	14	12.59	14	8.73	14	22.2	14	15.13	14	20.9	14	17.21
15	19.77	15	10.59	15	8.95	15	10.33	15	5.36	15	11.66	15	8.43	15	15.13	15	13.67	15	16.06	15	8.87	15	12.52	15	18.28	15	15.65	15	10.32	15	8.74	15	5.69	15	15.03	15	10.83	15	14.23	15	11.04
16	13.04	16	6.62	16	6.12	16	6.85	16	3.21	16	7.65	16	5.34	16	10.34	16	9.38	16	10.86	16	3.37	16	7.6	16	12.16	16	9.02	16	6.39	16	5.22	16	4.11	16	10.26	16	6.38	16	8.83	16	6.48
17	9.15	17	4.15	17	3.49	17	4.08	17	1.84	17	4.64	17	3.01	17	6.24	17	5.86	17	6.82	17	2.57	17	5.21	17	8.31	17	6.17	17	4.17	17	3.02	17	2.76	17	6.44	17	4.31	17	5.75	17	3.83
18	5.38	18	2.33	18	2.03	18	2.39	18	0.88	18	2.71	18	1.51	18	3.63	18	3.58	18	4.11	18	1.33	18	2.72	18	4.94	18	3.29	18	2.15	18	1.6	18	1.12	18	3.59	18	2.05	18	3.01	18	1.83
19	3.85	19	1.34	19	1.1	19	1.28	19	0.46	19	1.42	19	0.69	19	1.83	19	2.08	19	2.25	19	0.94	19	1.6	19	3.24	19	2.33	19	1.41	19	0.87	19	0.71	19	2.12	19	1.38	19	2.05	19	1.17
20	1.82	20	0.57	20	0.49	20	0.59	20	0.18	20	0.66	20	0.22	20	0.79	20	0.99	20	1	20	0.52	20	0.74	20	1.62	20	1.08	20	0.65	20	0.51	20	0.32	20	1.03	20	0.75	20	0.9	20	0.4
21	0.69	21	0.21	21	0.24	21	0.24	21	0.06	21	0.26	21	0.07	21	0.3	21	0.45	21	0.38	21	0.02	21	0.23	21	0.66	21	0.25	21	0.24	21	0.24	21	0.24	21	0.44	21	0.29	21	0.28	21	0.08

	22	0.31	22	0.06	22	0.07	22	0.08	22	0.01	22	0.08	22	0.02	22	0.08	22	0.15	22	0.11			22	0.09	22	0.26	22	0.11	22	0.1	22	0.09	22	0.14	22	0.11	22	0.14	22	0.11	22	0.02		
	23	0.03	23	0.01	23	0.01	23	0.02	23	0	23	0.02	23	0	23	0.02	23	0.03	23	0.02			23	0	23	0.04	23	0	23	0.01	23	0.03	23	0.01	23	0	23	0.01	23	0				
	24	0.01	24	0	24	0	24	0	24	0	24	0	24	0	24	0	24	0	24	0					24	0	24	0	24	0	24	0			24	0	24	0	24	0				
	25	0	25	0			25	0	25	0	25	0	25	0			25	0	25	0					25	0							25	0			25	0	25	0	25	0		
	26	0															26	0																26	0			26	0					

Supplementary File 4

Population Coverage of selected Five Vaccine Candidate Peptides: Global Estimate from IEDB Deposited Populations = 20.57%

Peptide	HLA allele	Start	End	Length	Score	Percentile Rank	TAP Transport Efficiency	C Terminal Cleavage Affinity
GIHEGIINV	HLA-A*02:02, HLA-A68:02, HLA-A*30:02	5	13	9	0.969405	0.01	0.292	0.9987
VTNKNIVTL	HLA-A*02:02, HLA-A68:02, HLA-B*58:01	6	14	9	0.550194	0.08	0.899	0.9987
YTGIVHNTF	HLA-A23:01, HLA-B53:01, HLA-B*58:01	61	69	9	0.343958	0.31	2.328	0.9946
FSNKGVLAY	HLA-A30:02, HLA-B15:03, HLA-B53:01, HLA-B58:01	27	35	9	0.948727	0.02	2.774	0.9977
KTFGMKGEY	HLA-A30:01, HLA-B15:03, HLA-B*58:01	18	26	9	0.882817	0.01	3.12	0.9948

Supplementary File 5

HLA Supertype Binding of selected Seven Vaccine Candidate SB Peptides: The Estimated Global Population Coverage from IEDB Deposited Populations = 99.04%

Peptide	HLA allele	Start	End	Length	Score	Percentile Rank	TAP Transport Efficiency	C Terminal Cleavage Affinity
GLLQEIQEV	<u>HLA-A*02:07</u> , <u>HLA-A*02:01</u> , <u>HLA-A*02:02</u> , <u>HLA-A*02:03</u> , <u>HLA-A*02:05</u> , HLA-B*13:02, HLAB*13:01	29	37	0.9854	0.01	0.171	0.9985	29
TTSEIIVNK	HLA-A*68:01, HLA-A*11:01, HLA-A*34:02, <u>HLA-A*03:01</u> , HLA-A*66:01, HLA-A*30:01, HLA*33:03, HLA-A*74:01	47	55	0.99074	0.01	0.416	0.9971	47
LYSANPTKF	HLA-A*29:02, <u>HLA-A*24:02</u> , HLA-A*23:01, HLA-A*29:02	48	56	0.97209	0.01	2.797	0.9967	48
YVNGKDSAL	<u>HLA-A*02:05</u> , <u>HLA-A*02:02</u> , <u>HLA-A*02:03</u> , HLA-B*14:03, HLA-B*81:01, HLA-B*46:01, HLA-B*35:03, HLA-B*35:02, HLA-B*42:01, HLA-B*08:01, <u>HLA-B*07:05</u> , HLA-B*14:03	5	13	0.5783	0.14	0.977	0.997	5
LRLELIQLM	<u>HLA-B*27:05</u> , HLA-B*27:03, HLA-B*38:01, HLA-B*39:06, HLA-B*14:02, HLA-B*14:01, HLA-B*39:01, HLA-B*38:02	20	28	0.02068	4	0.531	0.996	20

EQALLTQAY	HLA-A*26:01, HLA-A*43:01, HLA-A*29:02, HLA-A*30:02, HLA-A*66:01, HLA-B*15:01, HLAB*18:01, HLA-B*15:03, HLA-B*35:01, HLA-B*47:03, <u>HLA-B*44:03</u> , HLA-B*35:08, HLA-B*15:02, HLA-B*44:02	36	44	0.47829	0.12	2.811	0.9927	36
FSNKGVLAY	HLA-A*34:02, HLA-A*26:01, HLA-A*01:01, HLA-A*29:02, HLA-A*36:01, HLA-A*30:02, HLA-A*43:01, HLA-B*53:01, , HLA-B*58:02, HLA-B*46:01, HLA-B*15:02, HLA-B*57:01, HLA-B*15:17, HLA-B*15:01, HLA-B*15:16, HLA-B*35:08, HLA-B*58:01, HLA-B*15:03	27	35	0.94873	0.02	2.774	0.9977	27