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WHO Report on Global Surveillance of Epidemic-prone Infectious Diseases

World Health Organization

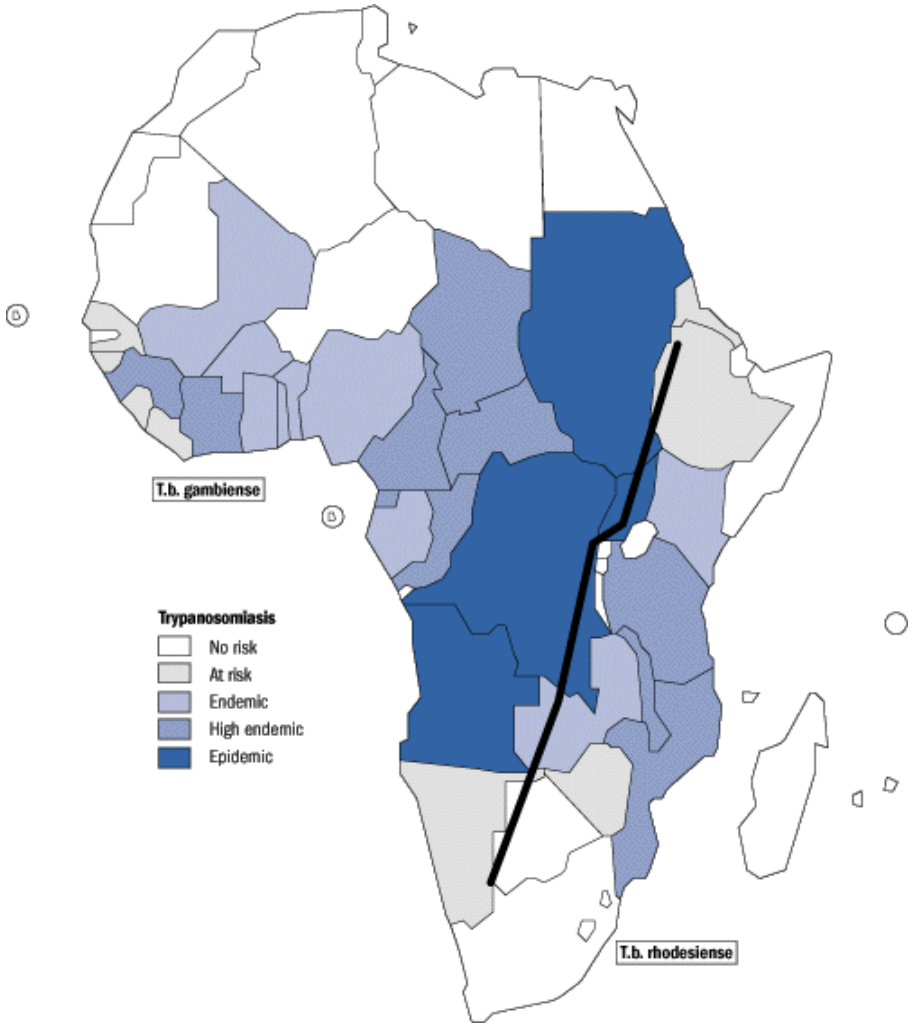
Department of Communicable Disease Surveillance and Response

CHAPTER 8
AFRICAN TRYPANOSOMIASIS

Background of the disease

Human African trypanosomiasis, commonly known as sleeping sickness, which had been virtually eliminated from Africa during the 1960s, has come back as a disease of major public health importance. It is caused by two different species of trypanosomes,[6] namely *Trypanosoma brucei gambiense* in West and Central Africa, and *Trypanosoma brucei rhodesiense* in East Africa. *T. b. gambiense* has a chronic and protracted course, and may last several years whereas *T. b. rhodesiense* is acute and can cause death in a matter of weeks or months. Both types of sleeping sickness are fatal if left untreated. Sleeping sickness is found uniquely in sub-Saharan Africa (Map 8.1).

Map 8.1 Distribution of gambiense and rhodesiense sleeping sickness in sub-Saharan Africa, 1999



Infection begins with the bite of an infected tsetse fly (*Glossina* species). During the first stage, trypanosomes multiply in the bloodstream and lymphatic system. This stage may last for years in the

[6] A trypanosome is a parasitic protozoa that causes a number of serious diseases in humans including sleeping sickness and Chagas disease.

case of gambiense sleeping sickness. At this stage there are few specific symptoms apart from the characteristic swollen cervical lymph nodes. The second stage begins when the parasite crosses the blood-brain barrier and invades the central nervous system. It is only at this second stage that the disease presents neurological symptoms and characteristic signs, including alteration of the mental state, tone disorders, sensory disorders, and coordination problems. At this stage, sleeping sickness causes an alteration of the circadian sleep/wake cycle. Other consequences include endocrinological, cardiovascular and renal disorders. The natural progression of the disease without treatment is towards body wasting, somnolence, coma, and death.

Trypanosomes are able to evade the immune system of the host because of their enormous potential for antigenic variation (over 1000 variants). It is very difficult to treat, particularly after it has crossed the blood-brain barrier. The medicines themselves are often in short supply, difficult to administer, and can be fatal. It has been estimated that between 3 and 5% of those treated in the last stage of illness die from the treatment itself. In addition, resistance to currently used drugs is a serious problem.[7] There is a clear need for new drugs, as well as better access to currently used ones.

Transmission

African sleeping sickness is transmitted primarily by bites from infected tsetse flies. Transmission is also possible through contamination with infected blood or through the placenta (congenital). There are seven different species of tsetse fly which can transmit the disease, and all live uniquely in sub-Saharan Africa. Tsetse flies have a life span on average of between one and six months. They live in warm, shady, humid areas. Once infected with trypanosoma, they remain infective for life.

Gambiense sleeping sickness occurs mainly in lowland rain forests of West and Central Africa. It is spread primarily by peri-domestic tsetse flies, living in areas surrounding human habitats such as cultivated land, and near small rivers or pools of water, frequented by people. Thus, there is close contact between people and tsetse flies as people go about their daily activities. Gambiense sleeping sickness is a chronic disease with a long latency period and people can be infective for many years without knowing. Studies have indicated that a small number of tsetse flies can maintain endemic transmission cycles at relatively high levels.[8] In light of the above, it is not surprising that it is very difficult to stop transmission of gambiense sleeping sickness completely in a given locality, and in many villages, sleeping sickness recurs periodically.

Rhodesiense sleeping sickness is much more virulent than gambiense and infected people usually die within a matter of months. Tsetse flies that carry the disease live primarily in the savannah woodlands of eastern and southern Africa. Humans are affected when they go into the savannah for activities such as gathering wood, gathering honey, hunting, fishing, keeping cattle or cultivating land.

An important feature of African trypanosomiasis is its focal nature. It tends to occur in circumscribed zones. Observed prevalence rates vary greatly from one geographical area to another, and even between one village and another within the same area. Thus, it is important to understand the ecology and resulting transmission patterns in each locality.

Surveillance

Sleeping sickness is one of the few communicable diseases where systematic population screening is necessary, particularly for gambiense sleeping sickness which has a very long almost asympotomatic period. There are several reasons for this including the difficulty of diagnosis which cannot normally

[7] Barrett MP and Fairlamb AH The biochemical basis of arsenical-diamidine crossresistance in African trypanosomes, *Parasitology Today*, 1999, 15(4):136-140.

[8] Lyons M, African Trypanosomiasis. In: Kiple, ed, *The Cambridge History of Human Disease,* Cambridge University Press, 1993.

be made in remote primary health care facilities,[9] the difficulty and high risk of treatment for the late stage, for which special skills are required, and the near impossibility of vector control. Therefore, the control measure most often used for gambiense sleeping sickness is systematic screening of the population to detect all cases, including those in both the first and second stage of disease, and then curing them. Guidelines for sleeping sickness surveillance have been developed by WHO in collaboration with sleeping sickness endemic countries.[10]

History

Sleeping sickness is an old disease. It was known to the slave traders, who rejected Africans with the characteristic swollen cervical glands, because they knew that these people would die untimely deaths.[11] There have been three particularly severe epidemics during the twentieth century. The first was from 1896 until 1906 in Uganda and the Congo basin, the second during the 1920s, and the third began in the 1970s and continues until the present time. Intensive systematic screening by mobile teams, of many millions of people per year at risk, halted the epidemic of the 1920s. The illness was practically eliminated by 1960. Such active population screening was not continued, at least partly because the disease had nearly disappeared from Africa. Not surprisingly, with the breakdown of the control system, the disease has re-emerged as a major health problem in recent years.

Description of the data

The data are provided by national African trypanosomiasis control programmes, and have been collected at special treatment centres, primarily through systematic screening programmes and referrals. Data provided are sometimes supplemented by published reports. Countries do not have an obligation to report cases of African trypanosomiasis to WHO, and therefore there are gaps in the database both in the number of cases reported and the number of people screened. The case reports are based on cases registered for treatment and include:

1. Village of origin of patients.
2. Disease stage.
3. Number of re-infections.
4. Number of deaths among treated subjects.
5. Sero-positive/parasite-positive ratio.

Data on the number of cases and the population screened are available from the beginning of the century.

[9] Serological detection with the CATT test (Card Agglutination Trypanosomiasis Test), is commonly used in screening. However, this test has insufficient specificity (too many false positives) to be used as a definitive diagnosis. Parasitological examinations are sufficiently specific, but are not sensitive enough unless done over a period of several successive days, because the level of parasites in the blood oscillates rapidly. If the blood is taken during the part of the cycle when few parasites are circulating, then a parasitological examination is likely to be negative, even though the disease is present. Appropriate treatment depends on whether or not the parasite has passed the blood/brain barrier. A spinal tap is needed for determining this.

[10] *Trypanosomiase Humaine Africaine: Surveillance epidemiologique et systeme d'information geographique (S.I.G),* Geneva, World Health Organization, 1996.

[11] Jansens PG, Kivits M and Vuylsteke. *Medicine et hygiene en Afrique Centrale de 1885 a nos jours.* Foundation Roi Baudoin, 1992.

Strengths and weaknesses of the data

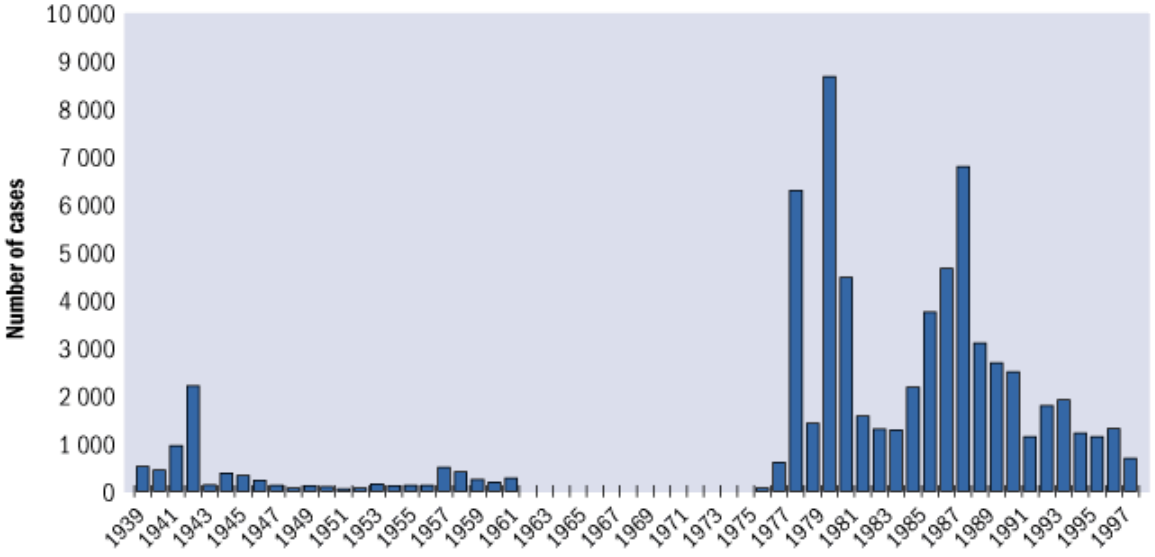
Only cases registered at special treatment centres are reported, and there are very few cases that come to the treatment centre without having either acute clinical disturbance or having been screened first. Therefore, the number of cases reported must be interpreted in light of the number of cases screened.

There are also problems of comparability with the reported data. There is a good deal of variability in the serological tests in time and space. In addition, the definition of cases, in the absence of parasitological confirmation, is difficult and depends on the number of tests used and the thresholds selected. These may change from one location to another.

Because sleeping sickness is such a focal disease, prevalence should refer only to the areas at risk. Aggregation to the national level is misleading, and obscures the problem. It is almost impossible to measure incidence rates of gambiense sleeping sickness, because the variable and long asymptomatic period of the disease makes it impossible to know when infection began with any accuracy. There is little or no information on mortality outside hospitals, since most of the deaths take place in rural areas with poor or non-existing civil registration systems. In particular, mortality in infants is difficult to measure, even with systematic screening, because of the well known systematic underreporting of infant deaths. In addition, it is very difficult to obtain age/sex breakdowns.

It is important to understand the context in which the data are collected, in order to be able to interpret epidemic curves produced from surveillance data. This can be illustrated by examining the reports from Uganda (Fig. 8.1). Between 1962 and 1975 no cases were reported. Increased reporting during 1977 to 1983 reflected an epidemic of rhodesiense sleeping sickness in Busuga (south-eastern Uganda). However the increases shown between 1986 and 1992 corresponded to both the resumption of systematic population screening for gambiense sleeping sickness in the western part of the country and to a resurgence of rhodesiense sleeping sickness in Busuga.

Fig. 8.1 Reported number of cases of African trypanosomiasis in Uganda, 1939-1998



1960s	Disease eliminated from Uganda
1970-1975	No data available
1977-1983	Epidemic of *T.b. rhodesiense* Busuga, south-eastern Uganda
1986-1992	Epidemic of *T.b. rhodesiense* continuing, plus resumption of systematic screening for *T.b. gambiense* in western Uganda

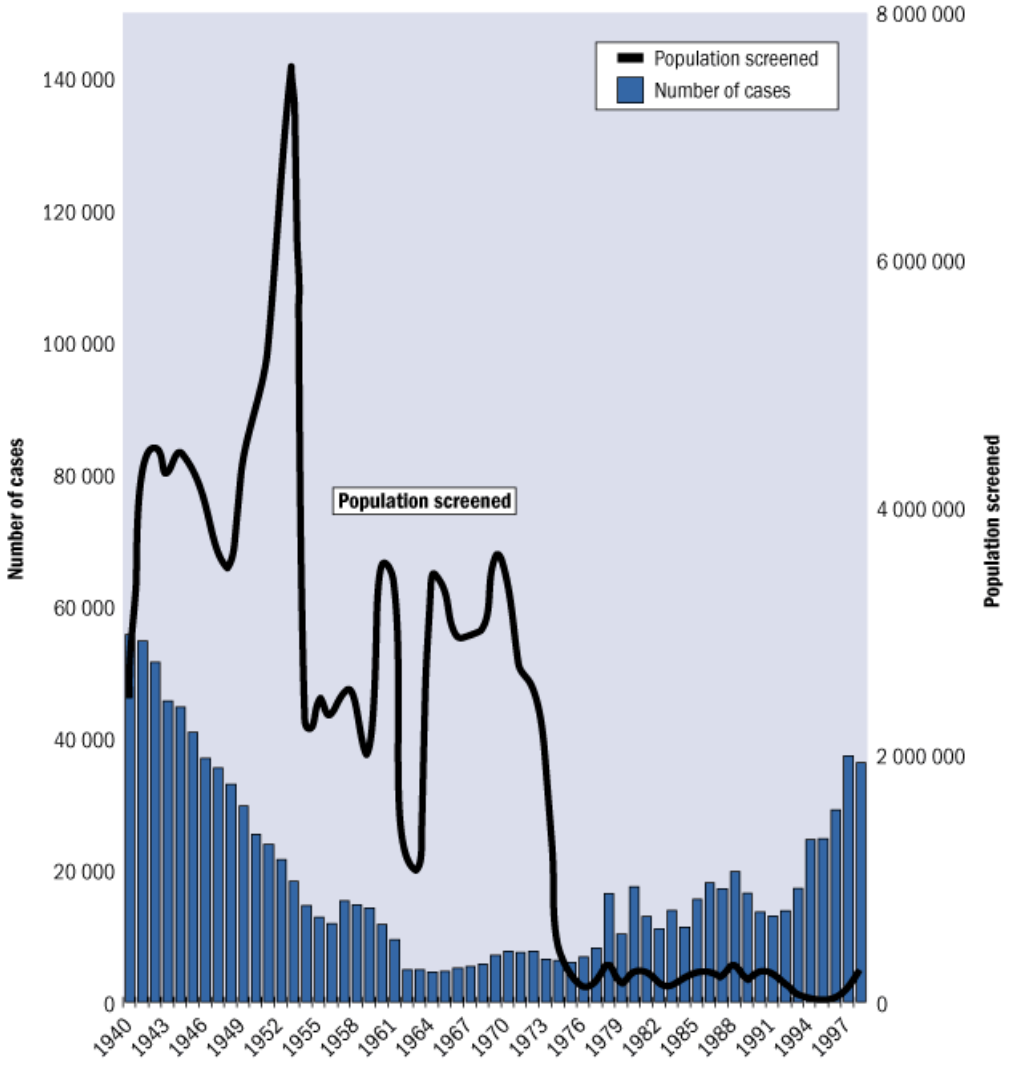
Trends

- Between 1940 and 1960, the reported number of cases of sleeping sickness declined dramatically, from nearly 60 000 cases per year to almost zero. These data present a relatively accurate reflection

of the trends during this period as there was systematic screening of populations at risk during these years (Fig. 8.2).

- Beginning in the mid-1970s and continuing until the present, there has been a steep increase in the number of cases reported. At the same time, population screening has been reduced to a very small number of people. This means that the number of reported cases is a gross underestimate of the current number of cases, since population screening is the main case-finding technique.
- Fig. 8.2 also illustrates the role that systematic population screening and subsequent treatment of cases play in the control of sleeping sickness. When the screening and treatment process stopped, it was followed by a dramatic increase in disease.
- The remoteness of the areas in which the disease occurs, and the focal nature of the disease, make it difficult to estimate the incidence and prevalence of the disease. In 1999, there were a total of 40 000 cases reported. However, only 3 to 4 million of the estimated 60 million people at risk of the disease were either actively screened, or had access to a health centre with diagnostic and treatment capability.
- In many countries there is no surveillance and the situation is poorly understood. These countries include Ghana, Nigeria, Sierra Leone, and Liberia.

Figure 8.2 Number of reported cases of African trypanosomiasis and population screened, 1940-1998



- The number of cases in Angola is increasing rapidly. Access to epidemic areas is extremely difficult because of the state of war.
- The Democratic Republic of the Congo is the worst hit country. More than 70% of the reported cases come from this country. Prevalence of more than 70% have been found in the Bandundu and Equateur provinces. In these provinces sleeping sickness is the largest cause of mortality.[12]
- The epidemic is progressing in Sudan, where only a few NGOs are treating the new cases.
- African trypanosomiasis is still a serious problem in the Cote d'Ivoire and in Guinea. In other West African countries, few cases have been reported and there is currently regular surveillance of at-risk areas.
- There is a continuing epidemic of rhodesiense sleeping sickness in the United Republic of Tanzania and Uganda.
- The number of new cases seeking treatment in the second stage of illness has been increasing for the past three years. In addition, the number of treatment failures during the second stage is increasing and is currently between 15 and 30%. The reason for this increase in treatment failure during the second stage remains unclear.

Conclusions

1. Sleeping sickness is in the midst of resurgence in sub-Saharan Africa.
2. It is urgent that systematic population screening in high-risk areas, together with appropriate treatment be re-established.
3. The current capacity in sub-Saharan African countries for effective surveillance of sleeping sickness is insufficient, in view of the logistic difficulties of surveillance, and the need for technical expertise for testing and treating patients, which is not available at peripheral health facilities. Because of this, most cases are not detected, not treated, and therefore fatal.

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Web pages

WHO African trypanosomiasis web pages:
http:/www.who.int/health-topics/afrtryps.htm

[12] Ekwanzala M et al. In the heart of darkness: sleeping sickness in Zaire. *Lancet,* 1996, 348:1427-1430.

Table 8.1 African trypanosomiasis, cases reported to WHO, number of countries reporting, and population screened, 1902-1998

Africa	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
Angola																				
Benin																				
Botswana																				
Burkina Faso																				
Burundi																				
Cameroon																				
Central African Republic	1,324	3,628	1,941	1,646	12	747	478	1,712	5,444	6,737	3,610	8,185	3,636	4,041	2,695	2,230	5,347	4,351	11,905	5,446
Chad													180					653	2,046	1,760
Congo																				
Cote d'Ivoire																				
Dem. Rep. of the Congo																				
Equatorial Guinea																				
Gabon																				1,198
Gambia																				
Ghana	0	1	6	7	3	34	16	45	52	83	104	57	12	17	8	12	10	14	27	8
Guinea																				
Guinea-Bissau																				
Kenya																				
Mali																				
Mozambique								2	0	2	2	2	1	6	3	1	0	1	1	0
Niger																				
Nigeria																				
Rwanda																				
Senegal																				
Sierra Leone																				
Sudan										268	140	139	24	210	232	113	331	707	280	723
United Rep. of Tanzania																				
Togo																				
Uganda																				
Zambia																				
Total no. of cases	1,324	3,629	1,947	1,653	15	781	494	1,759	5,496	7,090	3,856	8,383	3,853	4,274	2,938	2,356	5,688	5,726	14,259	9,135
No. of countries reporting	2	2	2	2	2	2	2	3	3	4	4	4	5	4	4	4	4	5	5	6
No. of countries reporting screening																				
Population screened																				

Table 8.1 African trypanosomiasis, cases reported to WHO, number of countries reporting, and population screened, 1902-1998

Africa	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
Angola					23	1,320	5,147	3,165	3,303	2,719	2,241	3,994	3,787	1,442	1,658	1,809	2,704	1,900	2,483
Benin													6,331					428	593
Botswana																			
Burkina Faso								969	903	8,104				15,214				3,072	10,193
Burundi																			
Cameroon										1,937									
Central African Republic	1,466	941	1,474	5,464	5,275	3,074	10,221	1,819	8,430	4,776	1,802	4,249	3,847	8,798	10,422	7,492	13,012	5,853	4,740
Chad						117				2,347		2,434							
Congo																			
Cote d'Ivoire													1,492	4,457				4,374	3,487
Dem. Rep. of the Congo									33,502						18,708				11,837
Equatorial Guinea												748	370	332	256	234	201	149	538
Gabon			55					2,239		4,737		1,699	1,363	1,008	1,670				
Gambia																			
Ghana	3	15	6	26	37	67	94	121	224	250	685	1,179	1,973	3,885	4,820	5,599	5,611	6,826	6,165
Guinea													5,369					3,891	8,008
Guinea-Bissau																			
Kenya																			
Mali													2,580					1,675	2,395
Mozambique	0	0	1	3	1	9	19	31	27	18	79	27	15	11	44	18	9	11	12
Niger													369					55	35
Nigeria														84,364					
Rwanda																			
Senegal													55					2,882	2,140
Sierra Leone																			
Sudan	544	851	367	222	82	77	29	18	38	62	63	83	32	91	150	89	110	109	40
United Rep. of Tanzania	79	49	104	476	459	360	1,751	3,262	1,750	1,449	2,868	2,304	1,475	1,075	536	306	411	633	943
Togo																	1,883	1,922	1,500
Uganda																		502	425
Zambia				3	5	22	6	0	6	4	12	11	13	160	28	34	94	24	53
Total no. of cases	2,092	1,856	2,007	6,194	5,882	5,046	17,267	11,624	48,183	26,403	7,750	16,728	29,071	120,837	38,292	15,581	24,035	34,306	55,587
No. of countries reporting	5	5	6	6	7	8	7	9	9	11	7	10	15	12	10	8	9	17	18
No. of countries reporting screening																		8	8
Population screened																		1,059,395	2,434,265

Table 8.1 African trypanosomiasis, cases reported to WHO, number of countries reporting, and population screened, 1902-1998

Africa	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953
Angola	2,147	2,277	2,446	2,420	2,269	3,519	3,474	3,647	4,318	2,499	1,052	989	1,286
Benin	1,030	1,514	1,027	762	805	542	339	322	381	271	233	212	145
Botswana													
Burkina Faso	6,665	5,713	3,280	3,491	1,904	1,217	1,270	1,190	1,020	982	839	741	753
Burundi													
Cameroon													
Central African Republic	3,984	3,781	6,309	5,140	4,168	4,455	3,306	738	1,093	934	2,361	1,038	546
Chad										545	536	1,141	816
Congo													
Cote d'Ivoire	4,231	4,955	3,430	4,739	3,945	2,767	2,446	3,378	3,567	3,534	2,964	2,690	2,783
Dem. Rep. of the Congo	10,951	9,968	10,093	10,142	11,080	8,426	9,289	9,873	7,609	6,109	6,086	5,242	3,804
Equatorial Guinea	348	313	217	174	248	205	236	287	317	211	174	217	174
Gabon													
Gambia													
Ghana	5,630	4,758	4,500	4,872	5,059	4,226	4,477	3,312	2,200	2,586	2,498	2,348	1,480
Guinea	11,000	10,350	7,669	6,787	5,788	5,861	5,475	5,457	4,029	3,458	2,826	2,548	1,978
Guinea-Bissau											1,945	2,169	1,793
Kenya													
Mali	2,500	2,021	1,250	1,208	1,166	822	629	711	724	678	529	625	765
Mozambique	66	129	305	200	180	152	253	249	184	188	197	209	238
Niger	96	69	68	30	34	12	18	9	5	3	2	4	2
Nigeria													
Rwanda													
Senegal	2,685	1,867	2,245	1,657	1,700	1,951	1,993	1,720	1,406	1,070	734	611	483
Sierra Leone			1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000			
Sudan	117	75	78	76	36	56	47	75	34	60	132	75	204
United Rep. of Tanzania	585	456	439	825	546	806	653	681	1,412	974	477	346	732
Togo	1,559	849	909	578	388	447	243	150	166	100	88	152	73
Uganda	934	2,190	123	367	317	214	107	54	104	78	38	48	134
Zambia	72	74	98	99	118	100	101	60	73	58	15	80	
Total no. of cases	54,600	51,359	45,486	44,567	40,751	36,778	35,356	32,913	29,642	25,338	23,726	21,485	18,189
No. of countries reporting	18	18	19	19	19	19	19	19	19	20	20	20	19
No. of countries reporting screening	8	8	8	8	8	8	7	7	9	9	10	10	10
Population screened	4,235,275	4,470,391	4,237,993	4,415,153	4,269,309	4,038,992	3,630,219	3,492,632	4,298,686	4,835,315	5,280,769	6,414,634	7,422,053

Table 8.1 African trypanosomiasis, cases reported to WHO, number of countries reporting, and population screened, 1902-1998

Africa	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Angola	997	1,015	418	177	93	32	63	14	16	9	66	177	103	36
Benin	127	148	201	117	118	85	84	64	42	1	34	20	22	11
Botswana													127	42
Burkina Faso	846	862	1,005	767	742	714	476	627	463	375	313	221	199	197
Burundi														
Cameroon								80	116	65	83	85	62	425
Central African Republic	506	557	123	118	78	22	42	20	18	29	18	51	58	24
Chad	439	470	277	277	384	213	402	311	258	194	92	97	186	99
Congo								75	20	33	64	24	40	28
Cote d'Ivoire	1,165	855	1,450	1,337	1,354	867	835	968	918	848	577	394	320	275
Dem. Rep. of the Congo	2,734	2,117	1,604	1,560	1,296	1,098	131	569	495	739	970	1,324	2,020	2,574
Equatorial Guinea	121	135	93	115	70	59	70	76	85	72	84	97	55	30
Gabon			90	132	120	83	109	186	166	109	119	135	91	94
Gambia						830	448							
Ghana	992	710	778	893	830	928	603	322	257	409	356	408	324	235
Guinea	1,850	1,800	1,600	1,470	1,226	950	1,078	865						
Guinea-Bissau	1,212	1,328	880	642	623	700	665	418	335	268	232	304		
Kenya														
Mali	854	812	958	875	1,146	1,208	1,187	1,166	833	771	538	432	351	259
Mozambique	267	170	127	221	167	83	88	66	52	39	34	80	57	113
Niger	3	1	2	14	3	4	2	3	3	2	1	0	0	22
Nigeria				5,045	4,862	4,549	3,789	2,129						
Rwanda														
Senegal	336	168	146	231	168	127	126	125	124	63	35	97	37	35
Sierra Leone	60	77	43	45	65	28	32							
Sudan	561	310	973	159	169	410	280	81	41	27	14	1	0	0
United Rep. of Tanzania	1,230	923	646	411	555	825	825	765	355	510	616	473	800	560
Togo	55	138	175	110	71	66	36	72	55	60	34	28	67	97
Uganda	103	114	108	490	394	233	177	257						
Zambia	3	30	25	20	68	69	93	103	81	108	155	99	128	110
Total no. of cases	14,461	12,740	11,722	15,226	14,602	14,183	11,641	9,362	4,733	4,731	4,435	4,547	5,047	5,266
No. of countries reporting	21	21	22	23	23	24	24	24	21	21	21	21	21	21
No. of countries reporting screening	4	4	5	5	5	5	5	5	3	3	5	4	3	3
Population screened	2,078,756	2,452,988	2,283,694	2,507,145	2,442,161	1,911,377	3,515,406	2,643,711	1,147,689	1,047,708	3,426,349	3,269,501	2,932,467	2,961,117

Table 8.1 African trypanosomiasis, cases reported to WHO, number of countries reporting, and population screened, 1902-1998

Africa	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Angola	36	14	26	22	6	4	3	126	83	118	337	170	306	145	163
Benin	17	23	11	4	9	6	3	5	19	41	6	4	0	1	0
Botswana	36	37	59	272											
Burkina Faso	164	262	145	114	79	73	68	94	82	74	62	64	134	153	44
Burundi															
Cameroon	219	211	229	125	349	283	326	385	674	379	240	153	269	399	1,079
Central African Republic	34	24	63	175	112	91	85	35	53	29	71	54	26	58	431
Chad	66	54	31	22	23	11	9	6	102	157	108				19
Congo	134	54	56	172	49	12	91	107	184	137	235	357	626	539	252
Cote d'Ivoire	376	176	148	104	110	131	98	219	269	502	391	428	378	410	253
Dem. Rep. of the Congo	3,247	4,959	6,172	5,121	5,206	4,118	4,298	3,755	3,818	4,390	5,790	5,167	4,817	5,103	5,703
Equatorial Guinea												26	95	75	81
Gabon	80	44	59	38	43	32	47	56	63	117	254	429	340	209	70
Gambia						9	18	9	35	2	16				
Ghana	174	169	101	156	130	85	94	79	57	42	34	24	18	17	23
Guinea					114	107	93	78	68	108	93	96	78	55	84
Guinea-Bissau															
Kenya															
Mali	356	233	231	190	210	388	188	164	105	105	83	65	34	27	36
Mozambique	43	26	35	20	27	11	5	14	19	20	83	100	83	108	70
Niger	9	0	4	0	2	1									
Nigeria															
Rwanda															
Senegal	43	16	16	15	17	10	2	3	4	1					
Sierra Leone															
Sudan	22	6	8	2	22	115	287	296	431	614	1,500	1,124	1,163	1,104	1,074
United Rep. of Tanzania	403	530		569	612	477	487	440	623	650	747	473	341		
Togo	93	83	23	79	26	25	17	11	4	20	14	11	12	6	3
Uganda									52	586	6,266	1,409	8,648	4,450	1,560
Zambia	80	77	127	196	396	387									
Total no. of cases	5,632	6,998	7,544	7,396	7,542	6,376	6,219	5,882	6,745	8,092	16,330	10,154	17,368	12,859	10,945
No. of countries reporting	20	20	19	20	20	21	19	19	20	20	19	18	18	17	18
No. of countries reporting screening	3	3	3	3	3	2	1	1	1	1	1	1	2	2	2
Population screened	2,991,580	3,600,710	3,414,392	2,675,709	2,518,500	1,910,024	471,588	222,968	106,110	156,608	293,059	128,849	234,614	226,892	133,909

Table 8.1 African trypanosomiasis, cases reported to WHO, number of countries reporting, and population screened, 1902-1998

Africa	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Angola	88	252	1,105	1,272	810	1,191	1,557	1,498	2,094	2,406	1,796	1,274	2,478	6,726	8,291	6,610
Benin	13	1	2	2	3	1	1	0	0	2	1	0	0	0	0	0
Botswana																
Burkina Faso	43				56			27	27	20	2	18	13	12	2	
Burundi																
Cameroon	3,113	1,038	1,102	585	341	106	66	65	41	22	16	12	8	9	6	55
Central African Republic	59	76	140	69	170	171	308	118	535	365	264	362	673	434	708	1,069
Chad	18	19	185	219	337	421	187	20	212	133	65	213	401	178	131	134
Congo	439	436	561	391	302	567	642	580	703	727	754	418	475	474	142	201
Cote d'Ivoire	289	246	243	208	181	315	287	365	349	456	462	404	596		18	21
Dem. Rep. of the Congo	6,282	7,150	8,769	10,514	9,696	9,587	9,814	7,712	5,824	7,757	11,384	19,340	18,158	19,342	25,200	27,044
Equatorial Guinea	72	66	291	366	98	59	36	28	30	85	32	62	38	46	68	59
Gabon	89	63	59	31	35	30	78	43	32	18	94	85	41		11	6
Gambia																
Ghana	5	7	11	7	7	4	15	4	6	16						
Guinea	59	60	37	31	42	60	34	41	29	24	27	26	33	47	92	57
Guinea-Bissau																
Kenya								90	7	2	2	1	0	0	6	20
Mali	83		50								27	17	11	5	0	0
Mozambique	118	88	59	16	8	2	6	3	7	24	10	16				
Niger																
Nigeria																
Rwanda																
Senegal																
Sierra Leone																
Sudan	1,290		200	65	58	193	56	67	58	28	62	69	56	157	737	
United Rep. of Tanzania	412	473	474	446	264	174	187	180	466	513	303	319	422	400	508	194
Togo	5	2	1	0	1	1	0	2	0	0	0	0	3	0	1	
Uganda	1,287	1,259	2,158	3,730	4,646	6,770	3,081	2,667	2,481	1,126	1,770	1,891	1,200	1,125	1,300	677
Zambia																
Total no. of cases	13,764	11,236	15,447	17,952	17,055	19,652	16,355	13,510	12,901	13,724	17,071	24,527	24,606	28,955	37,221	36,147
No. of countries reporting	19	16	18	17	18	17	17	19	19	19	19	19	18	16	18	15
No. of countries reporting screening	2	3	4	2	3	6	6	7	6	5	5	5	1	0	6	9
Population screened	118,807	189,216	227,773	224,587	184,957	289,534	158,321	228,898	137,244	130,291	41,158	36,604	853	853	102,284	247,677