WEST AFRICA
SMALLPOX ERADICATION/MEASLES CONTROL PROGRAM

SURVEILLANCE REPORT NO. 3

I. CURRENT SMALLPOX MORBIDITY
II. REFERENCE TABLES FOR SMALLPOX AND YELLOW FEVER, 1940-1965

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I. CURRENT SMALLPOX MORBIDITY

According to notifications received by the World Health Organization through September 7, 1966, 6,059 cases of smallpox have been reported from the 19 countries participating in the West African Smallpox Eradication/Measles Control Program. This compares with 5,157 cases reported during a comparable time period in 1965, an increase of 18 percent. The numbers of cases reported by country are shown in Table I.

Over 95 percent of the reported smallpox in the 19 countries continues to be reported from Dahomey, Mali, Niger and Nigeria. In Dahomey, 77 cases have been reported from the circumscription of Allada (Sud, Dép.) between July 20 and August 9. No cases were reported prior to July 20. In Mali, 45 of 73 cases reported since May 30 have been from the Cercle of Nioro bringing the total number of cases in 1966 to 72 in Nioro. During July and August, the majority of reported cases in Niger have been reported from the urban Cercles of Niamey and Zinder.

In Nigeria, 3,957 of the 4,442 reported cases have occurred in the Northern Provinces. There have been 281 cases reported from the Western Provinces, 103 from the MidWestern Provinces and 87 from the Federal Territory of Lagos. Only 14 cases have been reported from the Eastern Provinces.

Other recent reports since Surveillance Report No. 2 (September 1, 1966) include 2 cases reported from the Télimélé Region in Guinea and 2 cases in Lome, Togo.

Table I

Reported Smallpox Cases
in 19 West African Countries
1966*

Country	Most Recent Reporting Date in 1966	Cumulative No. of Cases 1966	Cumulative No. of Cases 1965**	Comments - 1966 Incidence
Cameroon	April 30	3(r)	0(r)	2 cases reported from Division of Mayo-Danai and one case from Division of Margui-Wandala.
C.A.R.	***	0	0	
Chad	***	0	66(i)	
Congo(B)	April 3	2	63	
Dahomey	Aug. 10	302	156	77 cases reported from circumscription of Allada, Sud, Dép., between July 20 and August 9.
Gabon	***	0	1	
Gambia	March 15	3	1	3 cases from Upper River, Division.
Ghana	June 10	12(i,r)	6	Kpandu District, Volta Region, declared free of smallpox on August 5.
Guinea	Aug. 13	5	51	2 cases reported from Télimélé Region week ending August 13.
Ivory Coast	***	0	3	
Liberia	***	0	49	
Mali	Aug. 14	270	529	78 cases reported from Cercle of San, 72 from Cercle of Nioro, and 55 from Cercle of Diré.
Mauritania	Aug. 11	****	0	Smallpox reported present in Cercle of Hodh occidental as of August 11.
Niger	Aug. 21	831	370	Over 130 cases reported from each of the Cercles of Niamey, Tillabery and Dosso. Since July 1, 45 of 60 reported cases have been from urban Cercles of Niamey and Zinder.
Nigeria	Aug. 20	4442	3796	3957 cases reported from the Northern Provinces, 281 from Western Provinces, 103 from Mid-Western Provinces.
Senegal	***	0	0	
Sierra Leone	July 9	99(i)	46	82 cases reported from Eastern Provinces
Togo	Aug. 14	39	10	8 cases reported from Region des Plateaux in late May.
Upper Volta	April 26	51	10	40 cases reported from Cercle of Bobo-Dioulasso.
	Total	6059	5157	

* Reports received by WHO through Sept. 7, 1966
** Comparable time period in 1965
*** No cases reported to WHO through Sept. 7, 1966
**** See comments - 1966 incidence
(i) Includes imported cases
(r) Revised

II. SMALLPOX AND YELLOW FEVER IN WEST AND WEST-CENTRAL AFRICA, 1940-1965

The tables and figures presented in this section of the Surveillance Report represent the best data available to the Smallpox Eradication Program at the present time regarding yellow fever and smallpox incidence and vaccinations from 1940 through 1965 in the 19-country Regional area of immediate concern. These data have been gleaned from a variety of sources including publications of WHO, OCCGE, OCEAC, national records and scientific publications. The WHO records listed in Appendix I represent the source of the data except where otherwise indicated. An explanation of symbols used in the tables is included in Appendix II. From all concerned with this Program, we would appreciate receiving appropriate revisions, additions and corrections.

It must be appreciated that case reporting of these diseases is not complete for any of the countries concerned. Recent reports are probably more complete overall than those for earlier years although the comparative completeness in reporting by time will vary from country to country.

In appraising the data pertaining to vaccination, it should be kept in mind that the figures from year to year are not additive; undoubtedly many persons have been revaccinated, some repeatedly. Additionally, the application of vaccine to the skin (representing the numbers recorded here) is not equivalent to immunization of the individual concerned. Vaccine preservation in the field is a difficult problem in tropical Africa; lyophilized smallpox vaccine has been in use for a comparatively short period of time and has not been employed in all countries. The precise type of vaccine used and its relative potency is not known on a country-by-country basis.

Yellow Fever

The number of recorded cases and deaths resulting from yellow fever is not large. The usual death/case ratio for yellow fever is stated to be about 7 to 10 percent in endemic areas.(1) Thus, even allowing for major under-reporting of cases, it is unlikely that there have been more than 2,500 cases of yellow fever in the West African area during the past 26 years.

Compared with annual case rates for other conditions, such as meningococcal infections (16.1 cases per 100,000 population; all Africa; 1957)[2], tetanus (26.6 per 100,000 population, Ibadan area, Nigeria; 1958)[3], whooping cough (79.8 cases per 100,000 population; all Africa; 1957)[2], and trachoma (103.4 cases per 100,000 population; former French West Africa; 1957)[4], yellow fever as a public health problem appears to be of lesser importance.

The following quotation from Deutschmann and Waddy's Survey of Public Health Problems in 14 French-speaking Countries in Africa is of interest:

> "Yellow fever, carried from man to man by Aedes aegypti, was - until vaccination against it was introduced in the 1930's - one of the diseases most dreaded by the expatriate in West Africa. Yet it was and is seldom seen in indigenous people, in typical form, although laboratory examinations confirm that from time to time considerable epidemics occur under the eyes of experienced clinicians.
>
> "The same applies to many other arthropod-borne virus infections. Dengue, the 'break-bone fever' of the European, is seldom diagnosed in a West African. O'nyong'nyong fever first appeared, to the eyes of medical science, when an epidemic of it swept through Uganda in 1959, killing few of its victims but causing severe invalidism. In contrast, recent researches have established that antibodies against O'nyong'nyong are present in a considerable proportion of the population of rural Senegal, and in 90 percent of that of Upper Volta, and that during the last five years there has been a large epidemic - probably of O'nyong'nyong, but conceivably of Chikungunya - in Upper Volta, all without the clinical diagnosis of a single case.
>
> "The rural West African child is subjected from birth to bombardment with a large number of arthropod-borne viruses. These fall into related groups, and thus relatively non-pathogenic infections may provide partial immunity to the effects of severely pathogenic infections such as yellow fever. Whatever the reasons, the rural West African is less susceptible than the rest of mankind to the effects of arthropod-borne viruses. The same may not apply to the rapidly increasing urban populations of West Africa. Overt epidemics of yellow fever do occur, though rarely, in West Africans."

Vaccination undoubtedly played some role in curtailing yellow fever incidence but it is suspected that its influence has been comparatively minimal. In several countries, including Nigeria, where yellow fever vaccination has been nil, the yellow fever incidence has been minimal. Although reporting, as noted, is far from complete, it is reasonable to conclude that large epidemics have been rare even though vaccination has not been practiced. It is well, however, to note particularly the last sentence in the quotation above: "(The lesser susceptibility of rural West

Africans) may not apply to the rapidly increasing urban populations..." In these urban areas it is possible that the exposure to other related arthropod-borne viral infections may be reduced. It is these related viruses which may be significant in offering protection via cross-immunity.

Therefore, urban areas would appear to warrant a higher priority for vaccination in circumstances where outbreak control activities are indicated. On the basis of the avaialble data, it would appear that routine mass vaccination for yellow fever control, especially in rural areas, would have a lesser priority.

Smallpox

In contrast to yellow fever, smallpox has exacted a high toll over the 26 years with over 345,000 cases reported; annual case rates varied from 3.2 to 31.5 per 100,000 population. Case fatality ratios derived from figures given in Table 1 indicate considerable variability in the mortality of the disease, with a high of 16.6 deaths per hundred cases in 1951 and a low of 5.5 deaths per hundred cases in 1958. These data would suggest an intermediate level of mortality, perhaps indicating the combined effects of variola major and variola minor, activity of intermediate strain viruses, or more probably variably complete reporting of both cases and deaths.

While a relatively large number of smallpox vaccinations have been performed during the period, the expected inverse relationship between numbers of vaccinations and numbers of smallpox cases is not strikingly apparent. Reasons for this were suggested in the introduction.

The commentary provided in Deutschmann and Waddy's Survey is of interest:

> "Smallpox vaccination was used in tropical Africa mainly to protect the towns, rather than in systematic campaigns in the rural areas, except when epidemics were discovered. It became the first extra activity taken on by sleeping sickness teams, so that rural vaccination was carried out in sleeping sickness foci before anywhere else. In 1945, an Anglo-French agreement was signed, providing for vaccination of everyone living within four miles of an international frontier. Since that time, it has become the ambition of most countries to vaccinate all their population every four years, and most have made great efforts to do this."
>
> "There are many possible reasons for the continued occurrence of smallpox in West Africa:

(1) The dried vaccine that has been used since 1945 is potent for only an hour or two after being made up with glycerin. It is admitted that the job of vaccinator has often been given to the dullard of a team and that a day's supply may be made up before starting work. Better supervision would prevent this cause of failure.

(2) Even in the best regulated area of Africa, it is virtually impossible to find every individual - even every village. Few Africans never travel, and seasonal and other migrations (which are not stopped or completely regulated by frontiers) spread infectious diseases.

(3) The very presence of frontiers conduces to the spread of communicable diseases. Frontier areas seem always to show higher prevalence and/or obstinate persistence of sleeping sickness, yaws and leprosy; outbreaks of smallpox are not uncommon in roadless villages near frontiers.

(4) There are ritual objections to smallpox vaccination in some countries, e.g., the south of Dahomey. "Send us your vaccinators. We shall take pleasure in cutting their throats" was actually said to a WHO Smallpox Adviser in 1961. At best, it is never a popular measure, though purer vaccines and cleaner techniques could decrease its unpopularity.

Smallpox is such an infectious disease, capable of achieving epidemic status rapidly from a single carrier, that the above reasons are more than sufficient to account for its persistence."

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[1] Tropical Health, Publication No. 996, National Academy of Sciences, National Research Council, Washington, D.C., 1962, p. 112.

[2] Ibid., Page 26.

[3] Bytchenko, B., Geographic Distribution of Tetanus in the World, 1951-1960. Bulletin World Health Organization 34:71-104, 1966.

[4] Tropical Health, Publication No. 996, National Academy of Sciences, National Research Council, Washington, D.C., 1962, p. 57.

Table 1

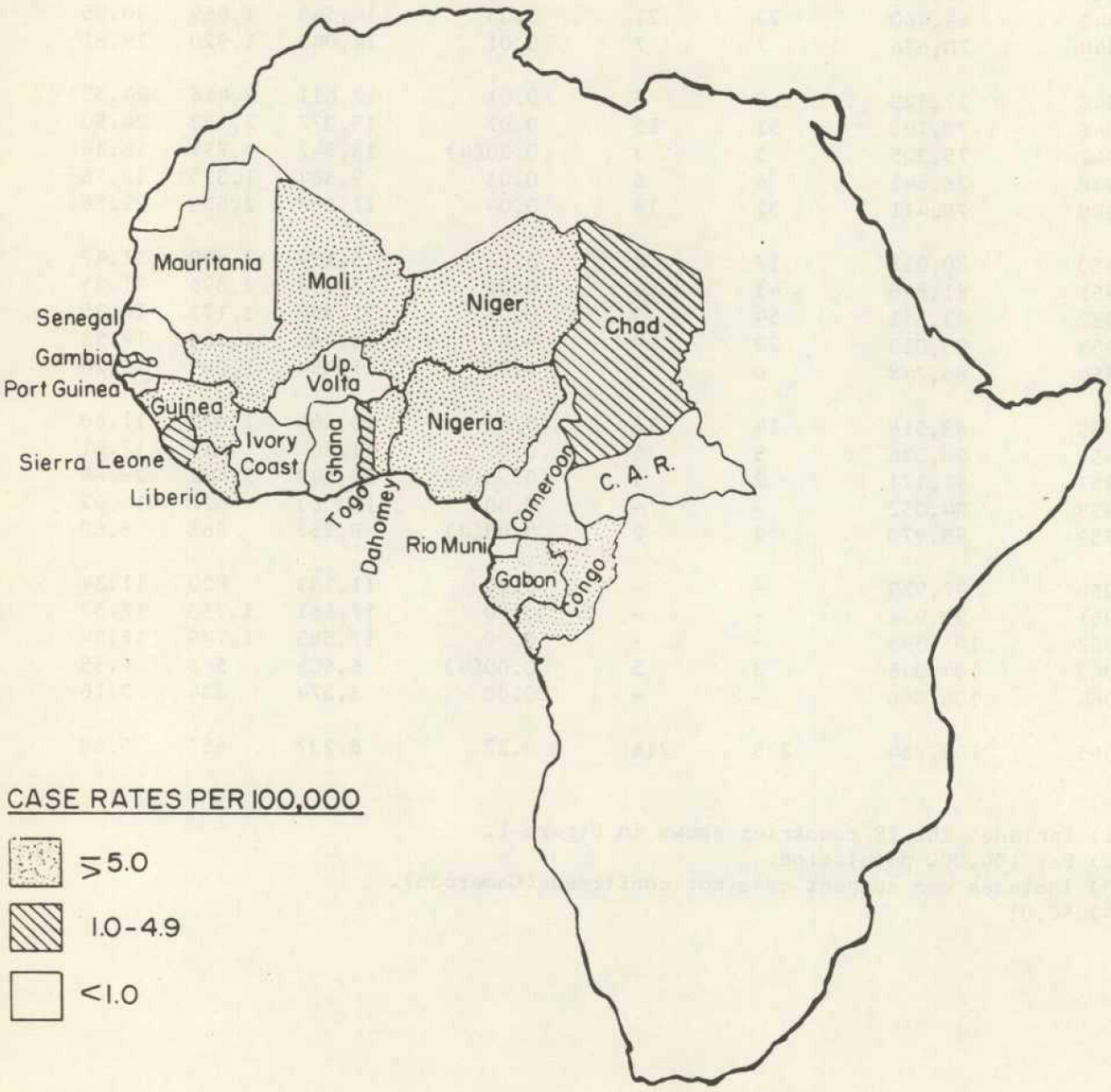
Yellow Fever and Smallpox
Total Number of Cases and Deaths
West and West-Central Africa, 1940-1965[1]

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Case Rate[2]	Cases	Deaths	Case Rate[2]
1940	65,377	9(3)	8	0.01	5,686	458	8.70
1941	66,712	27	19	0.04	4,745	479	7.11
1942	68,072	14	12	0.02	6,562	812	9.64
1943	69,460	22	21	0.03	14,549	1,869	20.95
1944	70,876	7	7	0.01	14,040	1,920	19.81
1945	72,323	9	7	0.01	17,611	2,416	24.35
1946	73,798	51	15	0.07	18,077	2,163	24.50
1947	75,305	3	3	0.00(4)	13,842	1,791	18.38
1948	76,841	6	6	0.01	9,804	1,325	12.76
1949	78,411	32	18	0.04	17,686	2,558	22.56
1950	80,013	17	8	0.02	25,183	3,880	31.47
1951	81,646	41	26	0.05	17,433	2,896	21.35
1952	83,311	54	20	0.06	21,950	3,173	26.35
1953	85,013	29	19	0.03	10,988	1,106	12.93
1954	86,748	6	3	0.01	11,454	1,089	13.20
1955	88,518	14	12	0.02	10,264	1,072	11.60
1956	90,326	5	5	0.01	11,664	919	12.91
1957	92,171	2	1	0.00(4)	27,549	2,542	29.89
1958	94,052	-	-	0.00	15,063	827	16.02
1959	95,970	2	2	0.00(4)	8,252	668	8.60
1960	97,929	-	-	0.00	11,103	800	11.34
1961	99,927	-	-	0.00	17,561	1,250	17.57
1962	101,965	-	-	0.00	17,685	1,749	17.34
1963	104,046	3	3	0.00(4)	6,605	563	6.35
1964	106,866	-	-	0.00	3,374	234	3.16
1965	109,764	238	216	0.22	6,237	656	5.68

(1) Includes the 19 countries shown in Figure 1.
(2) Per 100,000 population.
(3) Includes one suspect case not confirmed (Cameroon).
(4) <0.01

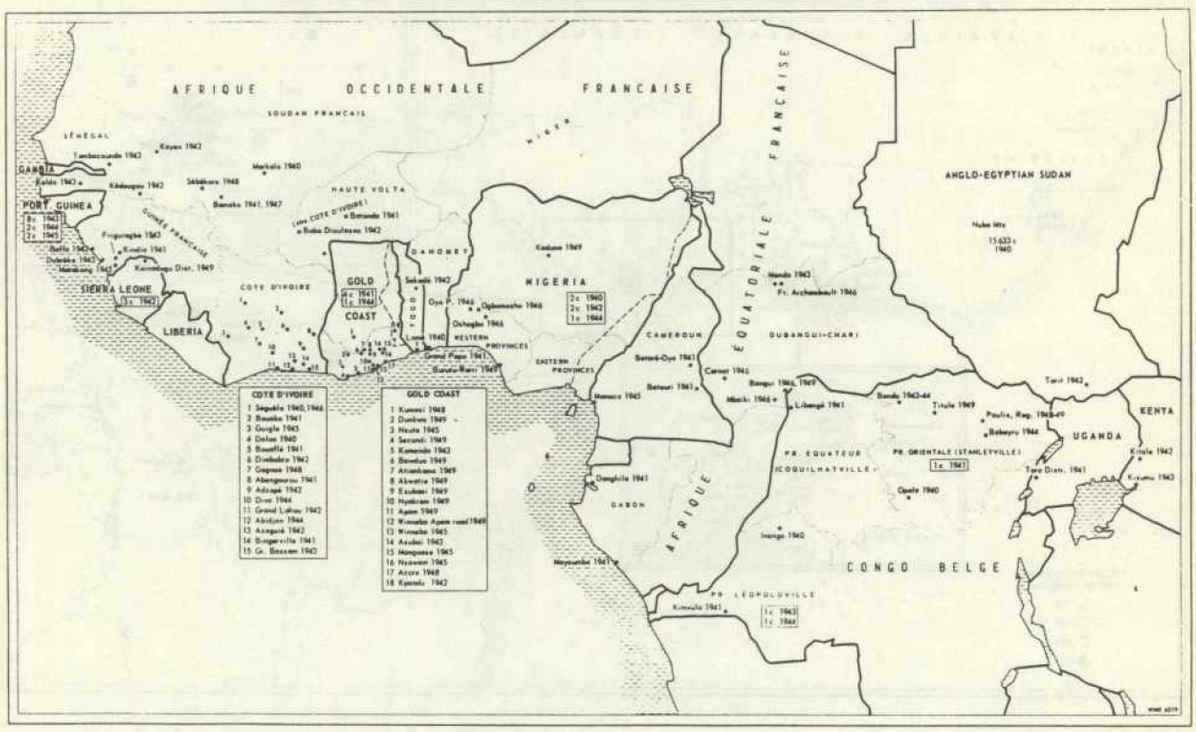
Figure 1

REPORTED SMALLPOX MORBIDITY - WEST AFRICA AVERAGE ANNUAL CASE RATE, 1964-65*



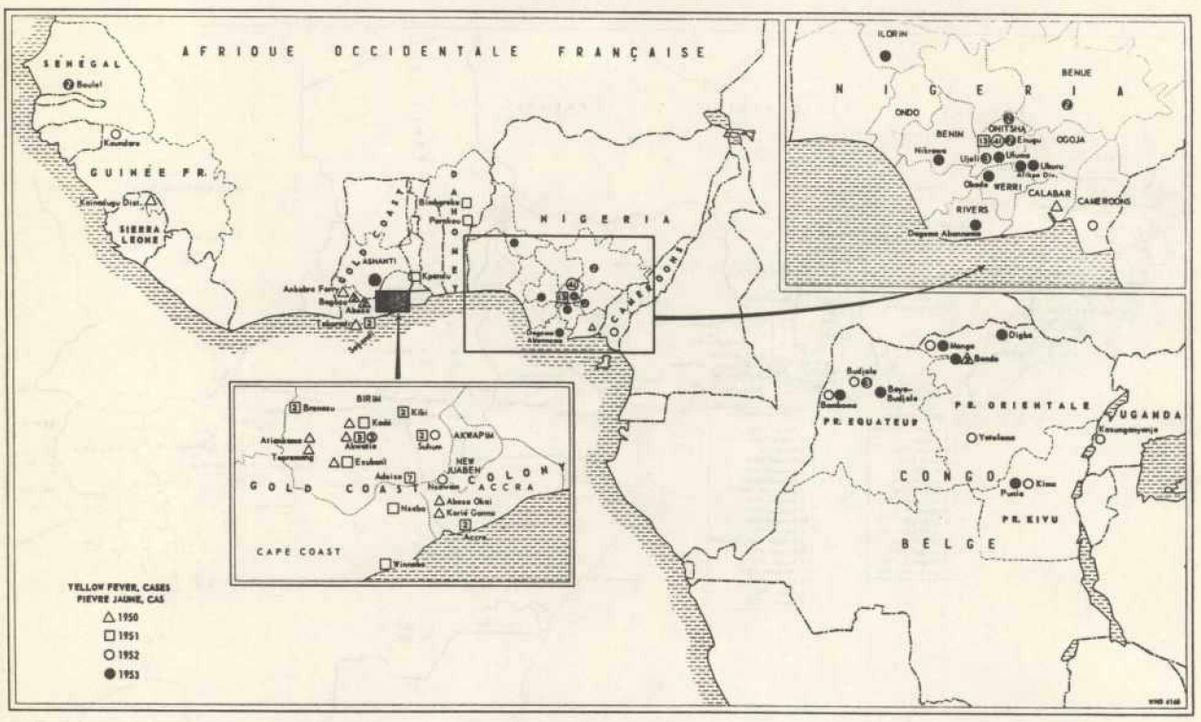
*FROM WHO REPORTS THROUGH JANUARY 19, 1966

FIGURE 1A
GEOGRAPHIC DISTRIBUTION OF REPORTED YELLOW FEVER
WEST AND WEST-CENTRAL AFRICA, 1940–1949*



*Bonnel, P. H. and Deutschman, Z. La Fievre Jaune En Afrique, Bull. WHO, 1954, 11, 325-389.

FIGURE 1B
GEOGRAPHIC DISTRIBUTION OF REPORTED YELLOW FEVER
WEST AND WEST-CENTRAL AFRICA, 1950–1953*



*See Figure 1A for source of data.

FIGURE 1C
GEOGRAPHIC DISTRIBUTION OF REPORTED CASES OF YELLOW FEVER
WEST AND WEST-CENTRAL AFRICA, 1954–1965*

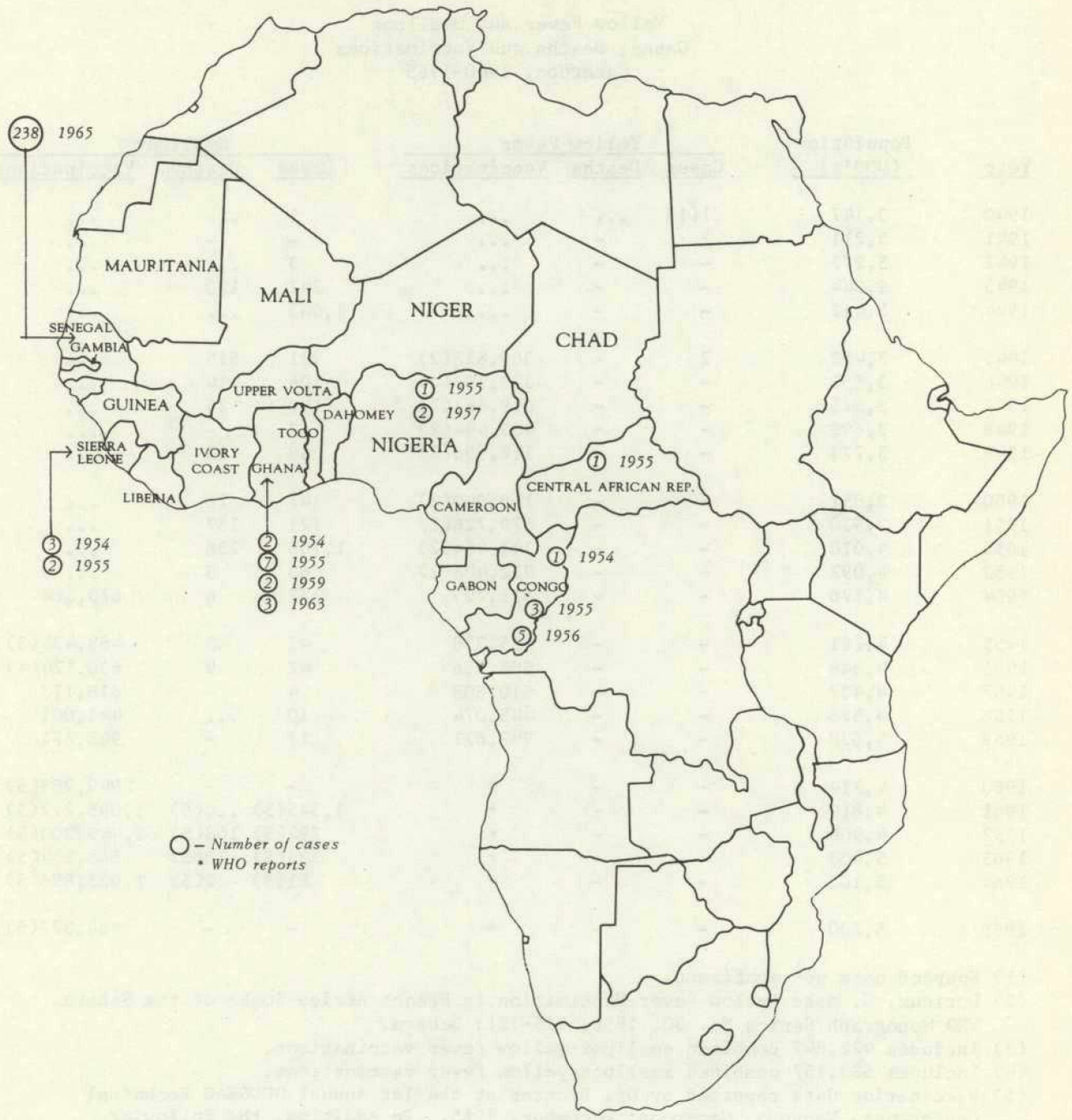


Table 2

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Cameroon, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	3,147	1(1)	...	...	1	...	...
1941	3,211	2	-	...	-	-	...
1942	3,277	-	-	...	3	...	...
1943	3,344	-	-	...	242	120	...
1944	3,412	-	-	...	1,063	...	...
1945	3,482	2	-	360,823(2)	931	515	...
1946	3,553	-	-	323,707(2)	106	14	...
1947	3,625	-	-	649,661(2)	140	25	...
1948	3,699	-	-	433,494(2)	3	-	...
1949	3,774	-	-	118,996(2)	58	13	...
1950	3,851	-	-	119,840(2)	147	26	...
1951	3,930	-	-	879,726(2)	721	157	...
1952	4,010	-	-	241,464(2)	1,106	236	...
1953	4,092	-	-	322,406(2)	63	3	...
1954	4,176	-	-	611,799	177	6	670,364
1955	4,261	-	-	435,338	42	3	468,434(3)
1956	4,348	-	-	589,936	42	9	630,174(4)
1957	4,437	-	-	610,608	4	-	618,113
1958	4,528	-	-	445,074	10	...	441,001
1959	4,620	-	-	948,671	17	-	948,671
1960	4,714	-	-	+	-	-	949,985(5)
1961	4,810	-	-	+	1,345(5)	...(5)	1,085,227(5)
1962	4,908	-	-	+	792(5)	108(5)	1,449,300(5)
1963	5,008	-	-	+	133(5)	20(5)	868,134(5)
1964	5,103	-	-	+	81(5)	2(5)	1,035,886(5)
1965	5,200	-	-	+	-	-	664,377(5)

(1) Suspect case not confirmed.
(2) Durieux, C. Mass Yellow Fever Vaccination in French Africa South of the Sahara. WHO Monograph Series No. 30, 1956, 115-121; Geneva.
(3) Includes 422,847 combined smallpox-yellow fever vaccinations.
(4) Includes 583,157 combined smallpox-yellow fever vaccinations.
(5) Vaccination data reported by Dr. Brottes at the 1st Annual OCCGEAC Technical Conference, Yaounde, Cameroon; December, 1965. In addition, the following morbidity and mortality data for smallpox, which differs from WHO data was reported:

	1961	1962	1963	1964
Cases:	1445	743	135	72
Deaths:	207	100	20	2

Table 3

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Central African Republic, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	817	...	...	...	1	-	...
1941	834	...	...	...	62	...	...
1942	851	...	...	...	-	-	...
1943	868	...	...	...	6	-	...
1944	886	...	...	**	154	-	...
1945	904	...	...	**	26	-	...
1946	922	4	4	**	5	-	...
1947	941	-	-	**	-	-	...
1948	960	-	-	**	-	-	...
1949	980	1	1	**	1	-	...
1950	1,000	-	-	**	-	-	...
1951	1,020	-	-	**	4	-	...
1952	1,041	-	-	**	461	59	...
1953	1,062	-	-	**	898	87	...
1954	1,084	-	-	**	38	1	**
1955	1,106	1	1	**	49	-	**
1956	1,129	-	-	**	-	-	**
1957	1,152	-	-	61,547	-	-	76,226
1958	1,176	-(1)	-	430,290	-	-	270,443
1959	1,200	-(2)	-	518,087	-	-	495,507
1960	1,224	-(3)	-	251,972	1	1	201,059
1961	1,249	-(3)	-	+	-	-	528,765(4)
1962	1,284	-	-	+	57	21	501,904(4)
1963	1,300	-	-	+	3	-	201,984(4)
1964	1,330	-	-	+	-	-	182,282(4)
1965	1,361	-	-	+	-	-	372,182(5)

** See tables 22 and 25 for number of vaccinations administered in French Equatorial Africa.

(1) Outbreak of yellow fever (60 cases) reported in Province Equateur, Democratic Republic of the Congo, which is contiguous to the C.A.R. border.

(2) 11 cases reported in Bili Region, Province Orientale, Democratic Republic of the Congo, which is contiguous to the C.A.R. border.

(3) Cases reported in Province Orientale, Democratic Republic of the Congo, which is contiguous to the C.A.R. border.

(4) Vaccination data reported by Dr. Brottes at the 1st OCCGEAC Technical Conference, Yaounde, Cameroon; December, 1965.

(5) Rapport Annuel (1965) de Service de Grandes Endemies, Ministere de la Sante Publique,Republique Centrafricaine.

Table 4

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Chad, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	1,757	2	2	...	590	1	...
1941	1,793	-	-	...	1,067	...	...
1942	1,830	-	-	...	3	-	...
1943	1,867	2	2	...	198	23	...
1944	1,905	-	-	**	2,388	528	...
1945	1,944	-	-	**	1,670	389	...
1946	1,984	-	-	**	243	5	...
1947	2,024	-	-	**	41	-	...
1948	2,065	-	-	**	12	-	...
1949	2,107	-	-	**	400	89	...
1950	2,150	-	-	**	460	98	...
1951	2,194	-	-	**	495	97	...
1952	2,239	-	-	**	2,481	607	313,947(3)
1953	2,285	-	-	**	697	115	376,349(3)
1954	2,332	-	-	**	563	102	671,485(3)
1955	2,380	-	-	**	258	57	941,638(3)
1956	2,429	-	-	**	56	2	709,686(3)
1957	2,479	-	-	6,503	57	2	539,457(3)
1958	2,530	-	-	727,249(1)	12	-	938,034(3)
1959	2,582	-	-	462,915(1)	34	1	516,479(3)
1960	2,635	-	-	212,190(1)	4	-	639,759(2)
1961	2,689	-	-	92,807(2)	273	62	802,643(2)
1962	2,744	-	-	73,401(2)	1,157	150	758,977(2)
1963	2,800	-	-	5,199(2)	10	1	593,922(2)
1964	2,842	-	-	1,650(2)	5	2	559,974(2)
1965	2,885	-	-	+	73	10	1,022,096(4,5)

** See table 22 for number of vaccinations administered in French Equatorial Africa.
(1) Ages 11 years + only.
(2) Rapport Du Service de la Sante Publique, Republique du Tchad.
(3) Service des Grandes Endemies du Tchad.
(4) Public Health Problems in 14 French Speaking Countries in Africa, Vol. I; 1966. National Acad. of Sci., Washington, D.C.
(5) Through November, 1965.

Table 5

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Congo (Brazzaville), 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	529	2	2	...	55	-	...
1941	540	3	3	...	72	...	...
1942	551	-	-	...	-	-	...
1943	562	7	7	...	-	-	...
1944	573	3	3	**	2	-	...
1945	585	-	-	**	-	-	...
1946	597	-	-	**	-	-	...
1947	609	-	-	**	-	-	...
1948	621	2	2	**	-	-	...
1949	634	3	3	**	1	-	...
1950	647	2	2	**	-	-	...
1951	660	1	1	**	-	-	...
1952	673	5	5	**	-	-	...
1953	687	8	8	**	12	1	...
1954	701	1	1	**	68	1	**
1955	715	3	3	**	-	-	**
1956	730	5	5	**	-	-	**
1957	745	-	-	91,789	-	-	146,253
1958	760	-(1)	-	165,912	2	-	273,587
1959	775	-	-	128,320	-	-	179,177
1960	791	-	-	46,656	-	-	117,226
1961	807	-	-	55,035	22	-	279,632
1962	823	-	-	114,673	1,313	159	495,027
1963	840	-	-	12,554	1,515	149	362,630
1964	853	-	-	+	196	21	+
1965	866	-	-	+	89	-	+

** See tables 22 and 25 for number of vaccinations administered in French Equatorial Africa.

(1) Outbreak of yellow fever (60 cases) reported in Province Equateur, Democratic Republic of the Congo, which is contiguous to the Congo (Brazzaville) border.

Table 6

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Dahomey, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	1,413	-	-	**	126	7	...
1941	1,442	2	1	**	468	57	...
1942	1,471	-	-	**	69	8	...
1943	1,501	-	-	**	121	11	...
1944	1,532	-	-	**	91	10	...
1945	1,563	-	-	**	333	43	...
1946	1,595	-	-	**	1,575	135	...
1947	1,628	-	-	**	162	29	...
1948	1,661	-	-	**	482	65	...
1949	1,695	-	-	**	436	47	...
1950	1,730	-	-	**	522	76	...
1951	1,765	2	2	**	730	100	...
1952	1,801	-	-	**	539	97	...
1953	1,838	-	-	***	352	67	...
1954	1,876	-	-	***	252	30	***
1955	1,914	-	-	***	16	1	***
1956	1,953	-	-	***	46	2	***
1957	1,993	-	-	***	414	41	***
1958	2,034	-	-	...	1,002	95	489,924
1959	2,076	-	-	...	1,708	212	519,916
1960	2,118	-	-	...	768	119	291,596
1961	2,161	-	-	322,463	119	21	330,867
1962	2,205	-	-	196,289	124	21	260,957
1963	2,250	-	-	+	228	32	+
1964	2,302	-	-	+	703	31	475,007(1)
1965	2,355	-	-	+	167	45	+

** 5,045,266 yellow fever vaccinations administered from 1939 through 1952: Breteau, H., Bull. W.H.O., 1954, 11, 453-481.

*** See tables 21 and 24 for number of vaccinations administered in French West Africa.

(1) Rapport Annuel de Service des Grandes Endemies, Ministere de la Sante Publique, Republique du Dahomey.

Table 7

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Gabon, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	287	-	-	...	-	-	...
1941	293	8	5	...	-	-	...
1942	299	...	...	...	-	-	...
1943	305	...	...	...	-	-	...
1944	311	-	-	**	-	-	...
1945	317	-	-	**	-	-	...
1946	323	-	-	**	-	-	...
1947	330	-	-	**	-	-	...
1948	337	-	-	**	-	-	...
1949	344	-	-	**			
1950	351	-	-	**	-	-	...
1951	358	-	-	**	1	-	...
1952	365	-	-	**	-	-	...
1953	372	-	-	**	-	-	...
1954	380	-	-	**	-	-	**
1955	388	-	-	**	8	-	**
1956	396	-	-	**	1	-	**
1957	404	-	-	**	-	-	...
1958	412	-	-	90,317	-	-	93,214
1959	420	-	-	103,476	-	-	102,278
1960	429	-	-	5,838	-	-	25,177
1961	438	-	-	14,361	-	-	41,952
1962	447	-	-	5,420	1	-	123,283(1)
1963	456	-	-	+	111	15	301,195(1)
1964	464	-	-	+	49	2	13,061(1)
1965	467	-	-	+	1	-	+

** See tables 22 and 25 for number of vaccinations administered in French Equatorial Africa.

(1) Vaccination data reported by Dr. Brottes at the 1st OCCGEAC Technical Conference in Yaounde, Cameroon, December, 1965.

Table 8

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Gambia, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	199	-	-	...	1	-	...
1941	203	-	-	...	-	-	...
1942	207	-	-	...	6	2	....
1943	211	-	-	...	-	-	...
1944	215	-	-	...	-	-	...
1945	219	-	-	...	79	1	...
1946	223	-	-	...	29	7	...
1947	228	-	-	...	25	-	...
1948	233	-	-	...	24	-	...
1949	238	-	-	...	69	-	...
1950	243	-	-	...	8	-	...
1951	248	-	-	...	2	-	...
1952	253	-	-	...	222	8	...
1953	258	-	-	...	226	6	...
1954	263	-	-	...	107	1	...
1955	268	-	-	...	31	3	...
1956	273	-	-	...	15	-	...
1957	279	-	-	...	1(1)	-	...
1958	285	-	-	1,054	21	2	73,426
1959	291	-	-	978	3	-	52,087
1960	297	-	-	1,085	7	-	42,546
1961	303	-	-	1,046	12	-	44,234(2)
1962	309	-	-	894	4	-	59,484(2)
1963	315	-	-	1,175	52	1	85,062(2)
1964	323	-	-	+	6	-	60,831(2)
1965	331	-	-	+	6	-	52,625(2)

(1) 30 cases and 3 deaths reported by Ministry of Health, The Gambia.
(2) Data from Ministry of Health, The Gambia; in 1963 there was a mass campaign in the Bathurst and Kombo area.

Table 9
Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Ghana, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	4,613	-	-	...	77	...	...
1941	4,707	4	4	...	1,470	172	...
1942	4,803	1	1	...	2,025	109	...
1943	4,901	2	2	...	20	-	...
1944	5,001	1	1	...	143	38	...
1945	5,103	4	4	...	702	128	...
1946	5,207	-	-	...	1,646	330	...
1947	5,313	-	-	...	848	173	...
1948	5,421	2	2	...	1,269	237	...
1949	5,532	22(1)	10(1)	...	91	6	...
1950	5,645	13(2)	4	...	353	42	...
1951	5,760	25(2)	15	...	85	4	...
1952	5,878	6(2)	6	...	522	18	...
1953	5,998	-	-	...	841	-	475,435
1954	6,120	2	1	...	35	-	1,041,672
1955	6,245	7	6	...	14	-	145,243
1956	6,372	-	-	...	36	-	...
1957	6,502	-	-	...	3	-	...
1958	6,635	-	-	...	166	9	...
1959	6,770	2(3)	2	...	105	14	...
1960	6,908	-	-	...	139	22	...
1961	7,049	-	-	...	75	8	...
1962	7,193	-	-	92,098(5)	135	8	1,190,062
1963	7,340	3(4)	3	+	23	-	+
1964	7,538	-	-	+	9	1	+
1965	7,742	-	-	+	7	-	+

(1) 34 cases, 15 deaths, reported by Bonnel, P.H. in Bull. W.H.O., 1954, 11.
(2) See table 9A for monthly distribution of cases.
(3) Reported from Tema in the Coastal District of Accra.
(4) 2 fatal cases reported from Gonja District in Northern Region and
1 fatal case reported from Kumasi District in Ashanti Region.
(5) Travelers only.

Table 9A

Yellow Fever by Month of Report
Ghana, 1950-1952

Months	Years		
	1950	1951	1952
January	5	1	0
February	0	1	1
March	1	4	1
April	1	5	0
May	1	2	0
June	1	1	1
July	1	6	2
August	1	2	0
September	0	1	0
October	1	0	0
November	1	1	0
December	0	1	1
TOTAL	13	25	6

Table 10

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Guinea, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	2,108	-	-	**	91	-	...
1941	2,151	3	3	**	44	7	...
1942	2,195	-	-	**	180	34	...
1943	2,240	7	6	**	375	36	...
1944	2,286	-	-	**	1,253	131	...
1945	2,333	-	-	**	1,765	169	...
1946	2,381	-	-	**	1,094	157	...
1947	2,430	-	-	**	422	31	...
1948	2,480	-	-	**	115	5	...
1949	2,531	-	-	**	2	-	...
1950	2,583	-	-	**	11	2	...
1951	2,636	-	-	**	12	-	...
1952	2,690	1(1)	1	**	141	11	...
1953	2,745	-	-	***	181	24	...
1954	2,801	-	-	***	108	4	***
1955	2,858	-	-	***	1,339	59	***
1956	2,916	-	-	***	1,070	30	***
1957	2,976	-	-	***	1,365	56	***
1958	3,037	-	-	...	707	23	...
1959	3,099	-	-	83,146	441	1	83,146
1960	3,162	-	-	9,976	176	...	9,940
1961	3,227	-	-	+	96	...	+
1962	3,293	-	-	+	2,948	335	+
1963	3,360	-	-	+	224	17	275,562(3)
1964	3,461	-	-	428,000(2)	300	13	1,050,711(3)
1965	3,565	-	-	+	69	5	712,380(3,4)

** 5,807,113 yellow fever vaccinations administered from 1939 through 1952: Breteau, H., Bull. W.H.O., 1954, 11; 453-481.

*** See tables 21 and 24 for number of vaccinations administered in French West Africa.

(1) Reported from Koundara, on the border with Portuguese Guinea.

(2) Public Health Problems in 14 French speaking countries in Africa, Vol. I: National Academy of Sciences, Washington, D.C., 1966.

(3) Vaccination data from Service des Grandes Endemies du Guinea.

(4) Through October, 1965.

Table 11

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Ivory Coast, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	2,303	2	2	**	199	8	...
1941	2,350	4	3	**	49	5	...
1942	2,398	8	6	**	74	3	...
1943	2,447	1	1	**	384	39	...
1944	2,497	2	2	**	432	43	...
1945	2,548	2	2	**	596	59	...
1946	2,600	1	-	**	1,677	117	...
1947	2,653	-	1	**	2,878	228	...
1948	2,707	1	-	**	803	77	...
1949	2,762	-	-	**	355	32	...
1950	2,818	-	-	**	699	41	...
1951	2,876	-	-	**	555	50	...
1952	2,935	-	-	**	2,992	230	...
1953	2,995	-	-	***	1,157	119	...
1954	3,056	-	-	***	734	27	***
1955	3,118	-	-	***	907	24	***
1956	3,182	-	-	***	1,565	76	***
1957	3,247	-	-	***	5,009	217	***
1958	3,313	-	-	...	2,856	187	...
1959	3,381	-	-	373,605(1)	784	35	373,605(1)
1960	3,450	-	-	...	1,634	62	...
1961	3,520	-	-	...	4,656	237	...
1962	3,592	-	-	389,954	2,006	102	2,093,631
1963	3,665	-	-	+	219	10	+
1964	3,793	-	-	521,032(1)	11	-	521,032(1)
1965	3,926	-	-	+	8	-	+

** 8,229,474 yellow fever vaccinations administered from 1939 through 1952: Breteau, H., Bull. W.H.O., 1954, 11; 453-481.

*** See tables 21 and 24 for number of vaccinations administered in French West Africa.

(1) Combined smallpox-yellow fever vaccinations reported by Service des Grandes Endemies du Cote D'Ivoire (Rapport du 29 mars 1965).

Table 12

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Liberia, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	647	-	-	...	...	...	...
1941	660	-	-	...	...	...	...
1942	673	-	-	...	...	...	...
1943	687	-	-	...	...	...	...
1944	701	-	-	...	...	...	...
1945	715	-	-	...	...	...	...
1946	730	-	-	...	87	13	...
1947	745	-	-	...	14	4	...
1948	760	-	-	...	-	-	...
1949	776	-	-	...	5	...	...
1950	792	-	-	...	...	...	...
1951	808	-	-	500	...	...	1,500,000
1952	824	-	-	...	...	...	...
1953	841	-	-	...	...	...	...
1954	858	-	-	...	...	...	...
1955	876	-	-	...	...	...	...
1956	894	-	-	...	...	...	...
1957	912	-	-	...	...	...	56,000(1)
1958	931	-	-	...	5,862	169	184,351
1959	950	-	-	...	591	...	...
1960	969	-	-	...	...	...	35,303
1961	989	-	-	...	1,119	27	896,485(1)
1962	1,009	-	-	...	323	10	...
1963	1,030	-	-	...	57	-	...
1964	1,044	-	-	...	128	4	104,841(1)
1965	1,059	-	-	...	40	-	+

(1) Vaccination data from National Public Health Service.

Table 13

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Mali, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	2,762	1(1)	1	**	95	2	...
1941	2,818	12(1)	10	**	27	-	...
1942	2,875	1(1)	1	**	515	26	...
1943	2,934	-(1)	-	**	5,855	322	...
1944	2,994	-(1)	-	**	1,971	99	...
1945	3,055	-(1)	-	**	3,036	90	...
1946	3,117	-	-	**	2,084	99	...
1947	3,181	3	3	**	769	8	...
1948	3,246	1	1	**	24	-	...
1949	3,312	-	-	**	89	-	...
1950	3,380	-	-	**	317	10	...
1951	3,449	-	-	**	1,321	104	...
1952	3,519	-	-	**	2,302	125	...
1953	3,591	-	-	***	1,721	120	...
1954	3,664	-	-	***	652	22	***
1955	3,739	-	-	***	893	111	***
1956	3,815	-	-	***	2,039	98	***
1957	3,893	-	-	***	2,982	276	***
1958	3,972	-	-	607,586	674	44	715,713
1959	4,053	-	-	497,449	772	27	563,068
1960	4,136	-	-	593,502	1,212	47	727,723
1961	4,220	-	-	600,358	1,706	92	1,117,727
1962	4,306	-	-	215,313	1,668	172	710,820
1963	4,394	-	-	+	1,096	82	609,583(2)
1964	4,548	-	-	+	321	17	723,318(2)
1965	4,707	-	-	+	615	18	608,935(2)

** 6,090,178 yellow fever vaccinations administered from 1939 through 1952:
Breteau, H., Bull. W.H.O., 1954, 11, 453-481.

*** See tables 21 and 24 for number of vaccinations administered in French West Africa.

(1) 1940-1945: Cases and deaths from Bonnel, P.H. and Deutschman, Z.,
La fievre jaune en Afrique. Bull. W.H.O., 1954, 11, 325-389.

(2) Data from Service des Grandes Endemies du Mali.

Table 14

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Mauritania, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	490	-	-	**	1	1	...
1941	500	-	-	**	-	-	...
1942	510	-	-	**	1	-	...
1943	520	-	-	**	100	11	...
1944	531	-	-	**	2	1	...
1945	542	-	-	**	67	7	...
1946	553	-	-	**	1	-	...
1947	564	-	-	**	41	-	...
1948	576	-	-	**	2	-	...
1949	588	-	-	**	-	-	...
1950	600	-	-	**	1	-	...
1951	612	-	-	**	64	5	...
1952	624	-	-	**	140	11	...
1953	637	-	-	***	158	15	...
1954	650	-	-	***	234	12	***
1955	663	-	-	***	27	-	***
1956	677	-	-	***	30	4	***
1957	691	-	-	***	86	12	***
1958	705	-	-	59,183	16	1	115,499
1959	719	-	-	70,010	32	1	112,696
1960	734	-	-	34,031	123	9	122,931
1961	749	-	-	55,762	12	-	186,227(1)
1962	764	-	-	46,157	40	2	185,010(1)
1963	780	-	-	+	1	-	59,593(1)
1964	811	-	-	+	-	-	147,443(1)*
1965	843	-	-	+	-	-	120,000(1)*

** 440,982 yellow fever vaccinations administered from 1939 through 1952: Breteau, H., Bull. W.H.O., 1954, 11, 453-481.

*** See tables 21 and 24 for number of vaccinations administered in French West Africa.

(1) Data from Service des Grandes Endemies du Mauritania.

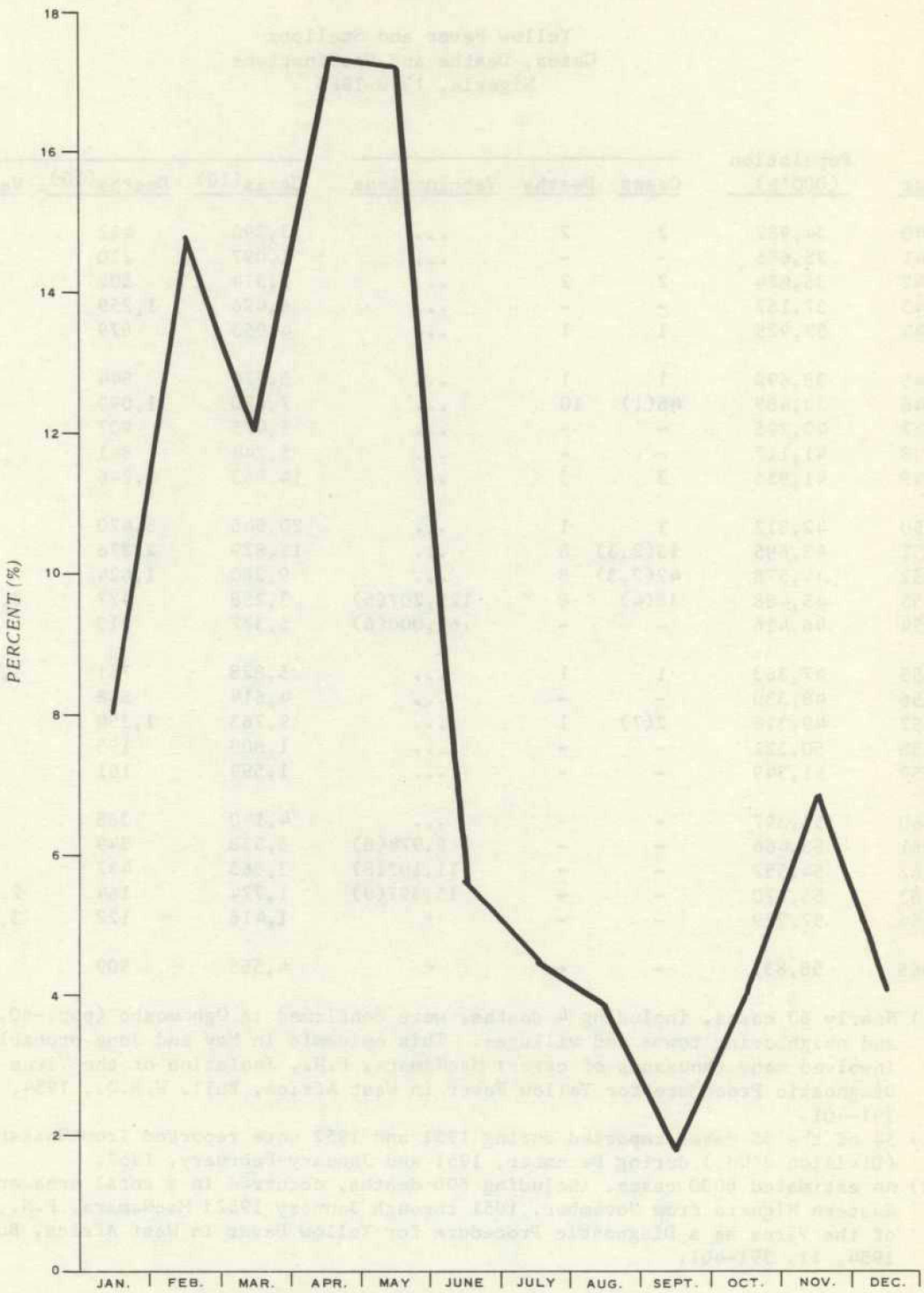
Table 15

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Niger, 1940-65

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	1,960	-	-	**	944	8	...
1941	2,000	-	-	**	311	22	...
1942	2,041	-	-	**	1,136	128	...
1943	2,083	-	-	**	565	33	...
1944	2,125	-	-	**	666	61	...
1945	2,168	-	-	**	662	51	...
1946	2,212	-	-	**	588	32	...
1947	2,257	-	-	**	2,519	301	...
1948	2,303	-	-	**	561	50	...
1949	2,350	-	-	**	890	99	...
1950	2,398	-	-	**	1,288	148	...
1951	2,447	-	-	**	1,007	48	...
1952	2,497	-	-	**	423	49	...
1953	2,548	-	-	***	666	57	...
1954	2,600	-	-	***	1,256	142	***
1955	2,653	-	-	***	278	24	***
1956	2,707	-	-	***	665	41	***
1957	2,762	-	-	493,742	797	61	606,676(2)
1958	2,818	-	-	485,641	501	48	687,076
1959	2,875	-	-	556,445	1,149	108	907,401
1960	2,934	-	-	902,767	2,408	127	1,011,715
1961	2,994	-	-	130,250(1)	1,740	91	244,486
1962	3,055	-	-	178,448(1)	1,038	107	499,508
1963	3,117	-	-	4,002(1)	445	27	535,990(2)
1964	3,217	-	-	+	29	4	586,703(2)
1965	3,320	-	-	+	509	56	298,804(2)

** 3,266,510 yellow fever vaccinations administered from 1939 through 1952: Breteau, H., Bull. W.H.O., 1954; 11, 453-481.
*** See tables 21 and 24 for number of vaccinations administered in French West Africa.
(1) 6 years of age and older.
(2) Data from Service des Grandes Endemies du Niger.

FIGURE 15
MONTHLY DISTRIBUTION OF SMALLPOX CASES, NIGER
PERCENT DISTRIBUTION OF AVERAGE NUMBER OF CASES
BY MONTH, 1960–1965*



Source of Data: Service des Grandes Endemies du Niger.

Table 16

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Nigeria, 1940-1965

Year	Population (000's)	Cases	Deaths	Vaccinations	Cases(10)	Deaths(10)	Vaccinations
1940	34,982	2	2	...	3,298	422	...
1941	35,696	-	-	...	1,097	210	...
1942	36,424	2	2	...	2,514	502	...
1943	37,167	-	-	...	6,496	1,259	...
1944	37,925	1	1	...	4,958	879	...
1945	38,699	1	1	...	5,576	844	...
1946	39,489	46(1)	10	...	7,620	1,099	...
1947	40,295	-	-	...	5,425	907	...
1948	41,117	-	-	...	5,744	841	...
1949	41,956	3	3	...	14,863	2,246	...
1950	42,812	1	1	...	20,946	3,420	...
1951	43,686	13(2,3)	8	...	11,879	2,276	...
1952	44,578	42(2,3)	8	...	9,260	1,624	...
1953	45,488	18(4)	8	121,207(5)	3,258	427	3,699,298(5)
1954	46,416	-	-	67,000(6)	6,372	710	...
1955	47,363	1	1	...	5,828	751	1,939,885
1956	48,330	-	-	...	4,614	588	...
1957	49,316	2(7)	1	...	9,763	1,354	360,000(11)
1958	50,322	-	-	...	1,808	193	...
1959	51,349	-	-	...	1,599	161	...
1960	52,397	-	-	...	4,140	388	...
1961	53,466	-	-	9,974(8)	3,538	349	380,570(11)
1962	54,557	-	-	11,102(8)	3,863	437	384,532(11)
1963	55,670	-	-	15,697(9)	1,774	164	2,463,073(12)
1964	57,229	-	-	+	1,416	122	3,127,559(13)
1965	58,831	-	-	+	4,566	509	+

(1) Nearly 60 cases, including 4 deaths, were confirmed in Ogbomosho (pop.-60,000) and neighboring towns and villages. This epidemic in May and June probably involved many thousands of cases: MacNamara, F.N., Isolation of the Virus as a Diagnostic Procedure for Yellow Fever in West Africa, Bull. W.H.O., 1954, 11, 391-401.

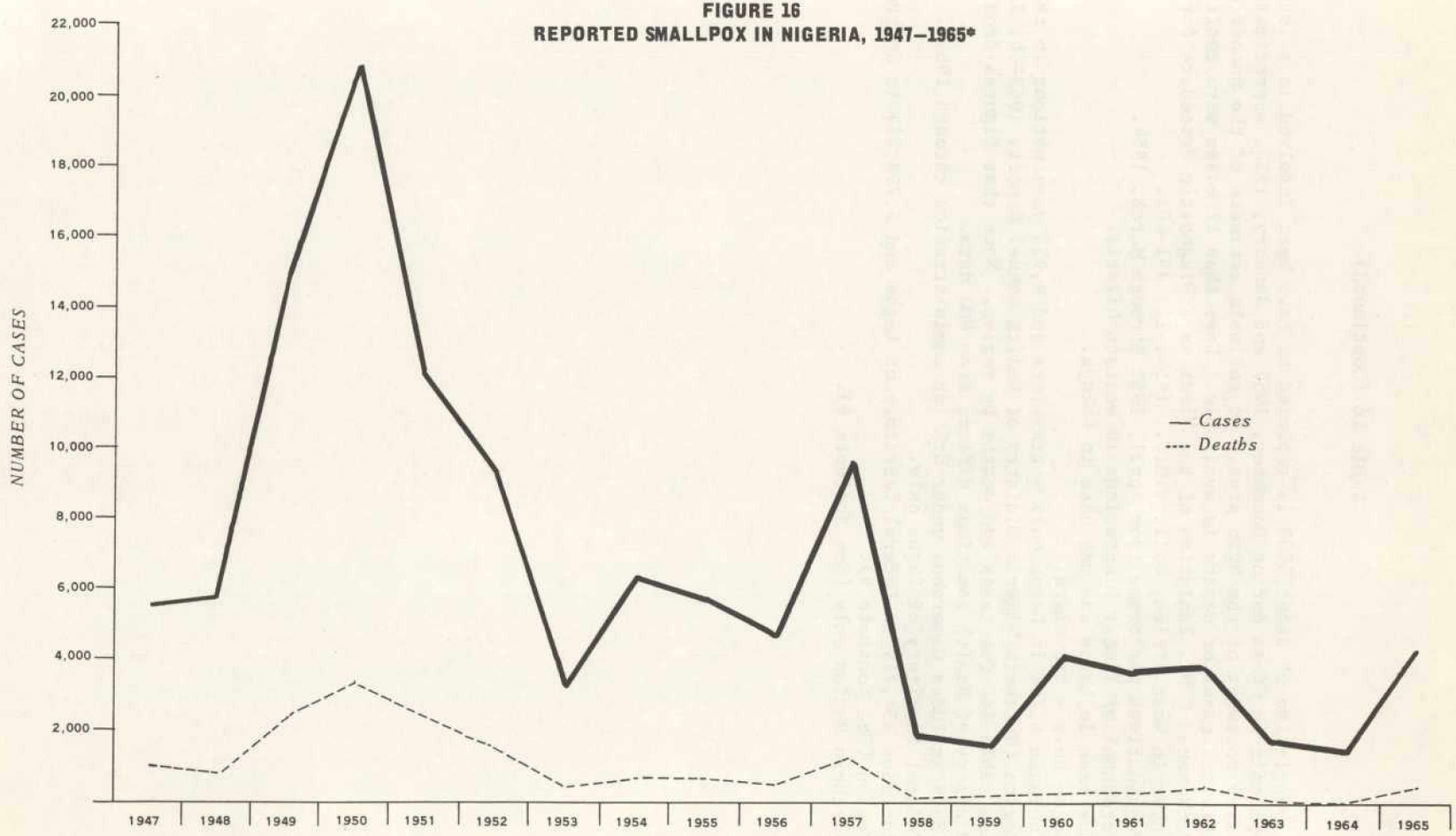
(2) 54 of the 55 cases reported during 1951 and 1952 were reported from Onitsha Province (Division d'Ud.) during December, 1951 and January-February, 1952.

(3) An estimated 6000 cases, including 600 deaths, occurred in a rural area around Ngwo, Eastern Nigeria from November, 1951 through January 1952: MacNamara, F.N., Isolation of the Virus as a Diagnostic Procedure for Yellow Fever in West Africa, Bull. W.H.O., 1954, 11, 391-401.

Table 16 (Continued)

(4) A population of about 5000 is reported to have been involved in a localized epidemic in Ufama during December, 1952 and January, 1953, approximately 30 miles soutwest of the Ngwo area. No reliable estimate of the number of clinical cases or deaths is available. Less than 12 cases were confirmed.: MacNamara, F.N., Isolation of the Virus as a Diagnostic Procedure for Yellow Fever in West Africa, Bull, W.H.O., 1954, 11, 391-401.
(5) Vaccinations performed from April, 1953 through March, 1954.
(6) Personnel of Timber Plantations in Western Nigeria.
(7) One case in Lagos and one case in Lokoja.
(8) Lagos only - travelers.
(9) Includes 6,744 in Lagos only - travelers and 8,953 vaccinations in the Northern Region (Northern Nigeria Ministry of Health Annual Report, 1963-64; Kaduna).
(10) See table 16A for cases and deaths by region. Note that figures from Nigerian Ministry of Health sometimes differs from WHO data.
(data includes Cameroons under British administration through 1959).
(11) Federal Territory of Lagos only.
(12) Includes 254,719 in Federal Territory of Lagos and 2,208,354 in Northern Region (See footnote 9).
(13) Northern Region only (See footnote 9).

FIGURE 16
REPORTED SMALLPOX IN NIGERIA, 1947–1965*



**Source: Federal Ministry of Health, Lagos.*

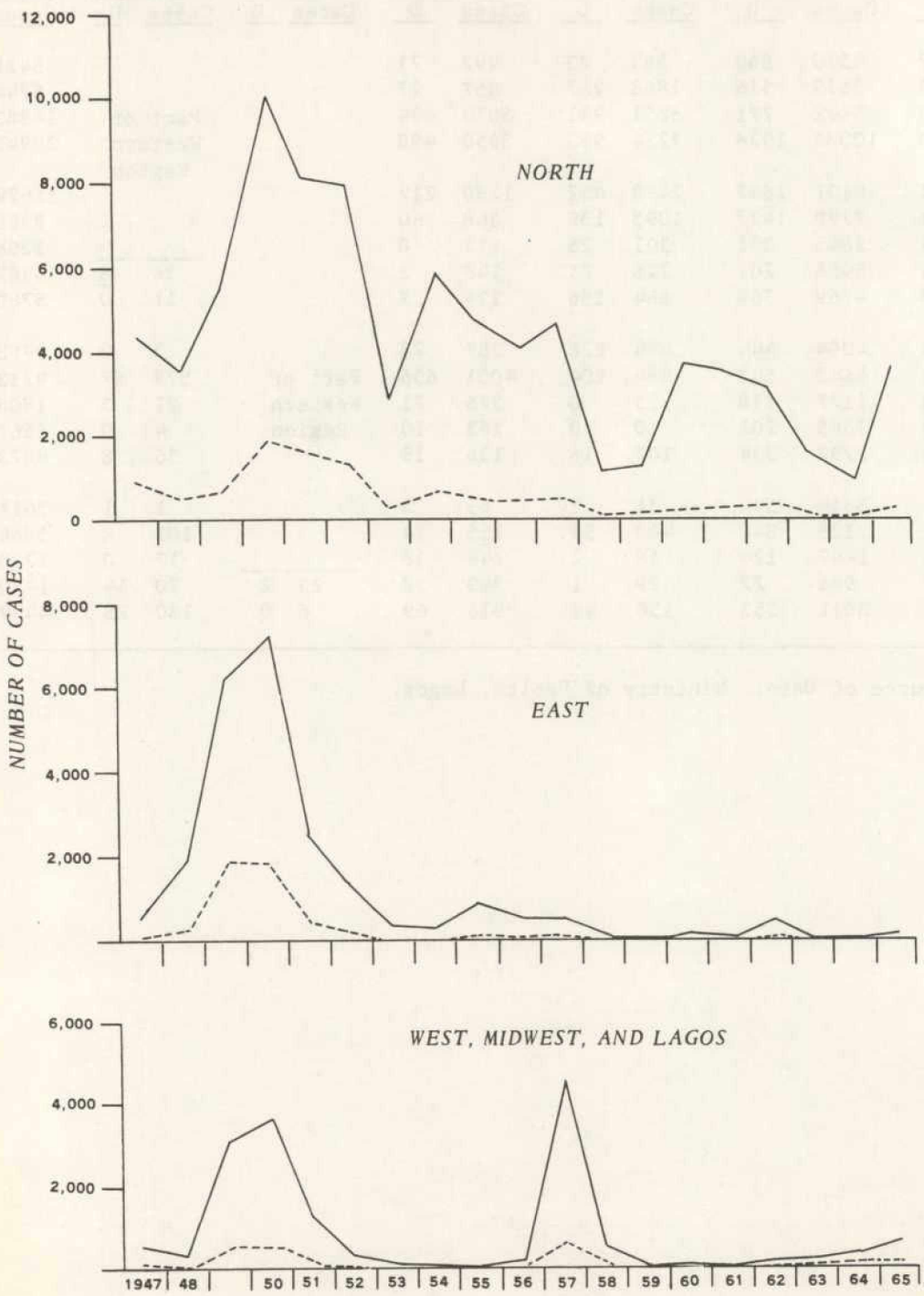
Table 16A

Notification of Smallpox Cases and Deaths by Region*
Nigeria, 1947-1965

Year	Region										All Nigeria	
	North		East		West		Midwest		Lagos			
	Cases	D	Cases	D	Cases	D	Cases	D	Cases	D	Cases	D
1947	4370	860	563	23	492	71					5425	954
1948	3519	516	1868	287	357	27					5744	830
1949	5542	771	6251	981	3070	494			Part of		14863	2246
1950	10036	1928	7254	953	3650	498			Western		20940	3379
									Region			
1951	8101	1632	2498	432	1280	212					11879	2276
1952	7799	1427	1093	139	368	60					9260	1626
1953	2845	391	301	26	112	8					3258	425
1954	5958	702	226	21	148	3			26	6	6362	733
1955	4769	569	884	156	126	7			11	0	5780	732
1956	4054	444	484	126	257	23			3	0	4798	593
1957	4643	543	484	104	4001	636	Part of		579	67	9733	1350
1958	1177	118	25	0	576	71	Western		21	3	1808	193
1959	1365	202	10	0	163	10	Region		4	0	1562	212
1960	3797	334	107	16	136	19			36	8	4073	377
1961	3514	344	31	1	65	3			1	1	3611	349
1962	3128	348	480	59	155	24			101	8	3864	439
1963	1497	124	18	2	246	38			17	0	1778	164
1964	966	72	29	1	340	38	25	2	70	14	1430	127
1965	3611	353	156	49	536	69	6	0	180	25	4489	496

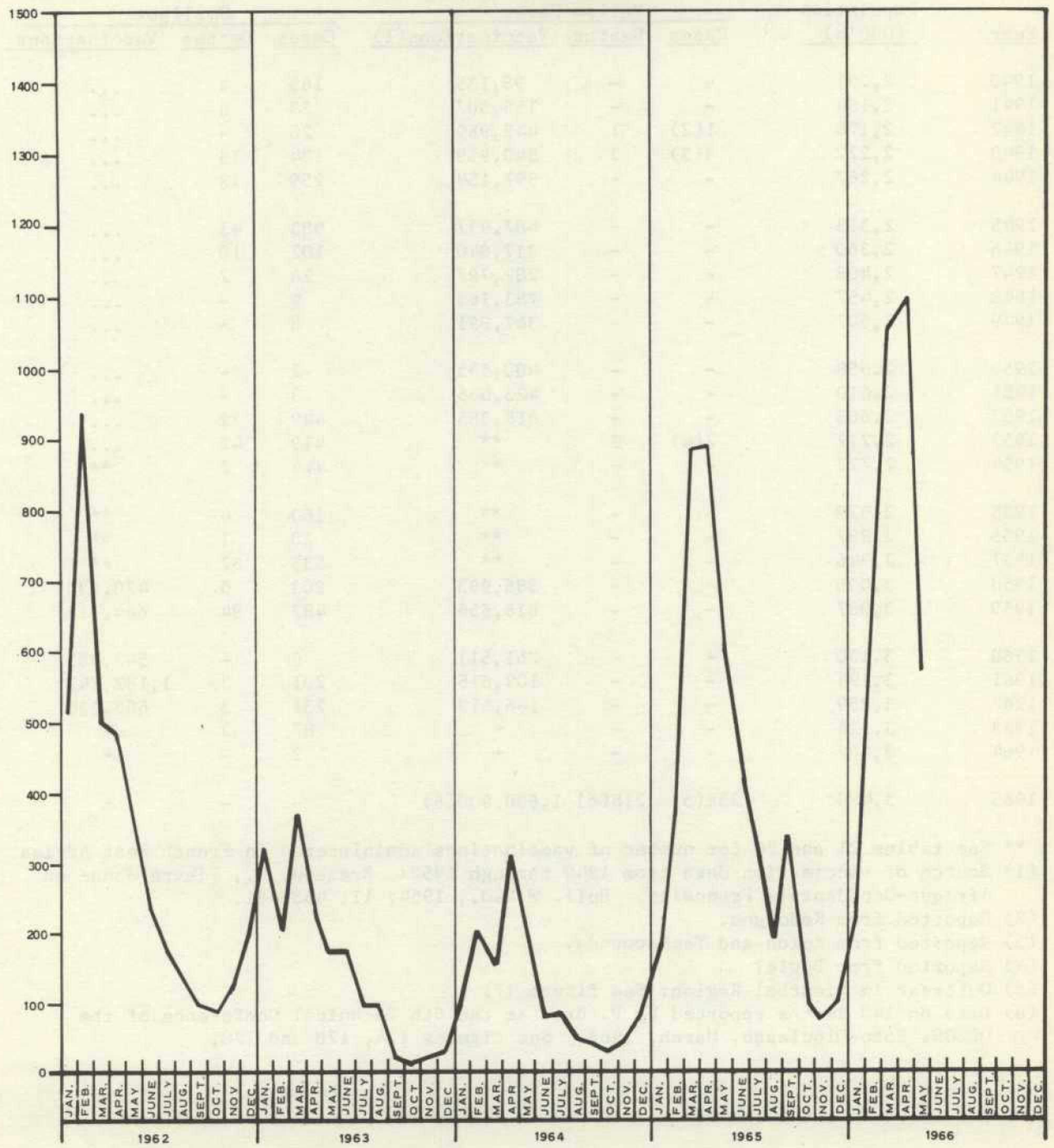
* Source of Data: Ministry of Health, Lagos.

FIGURE 16A
REPORTED SMALLPOX IN NIGERIA, BY REGION, 1947–1965*



*Source: Federal Ministry of Health, Lagos.

FIGURE 16B
SMALLPOX BY MONTH OF REPORT
NIGERIA, 1962–1966*



Source: Ministry of Health, Lagos.
**Through April 1966.*

Table 17

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Senegal, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations(1)	Cases	Deaths	Vaccinations
1940	2,091	-	-	98,135	165	4	...
1941	2,134	-	-	156,307	70	6	...
1942	2,178	1(2)	1	443,989	28	-	...
1943	2,222	3(3)	3	540,959	184	15	...
1944	2,267	-	-	597,154	259	12	...
1945	2,313	-	-	487,937	983	43	...
1946	2,360	-	-	317,840	102	10	...
1947	2,408	-	-	282,797	28	2	...
1948	2,457	-	-	783,166	9	-	...
1949	2,507	-	-	367,891	8	-	...
1950	2,558	-	-	400,533	2	-	...
1951	2,610	-	-	423,665	3	-	...
1952	2,663	-	-	818,385	449	22	...
1953	2,717	2(4)	2	**	419	42	...
1954	2,772	-	-	**	444	7	**
1955	2,829	-	-	**	160	4	**
1956	2,887	-	-	**	20	1	**
1957	2,946	-	-	**	555	62	**
1958	3,006	-	-	386,993	203	5	470,632
1959	3,067	-	-	618,656	487	94	664,118
1960	3,130	-	-	251,511	6	-	542,933
1961	3,194	-	-	109,615	201	3	1,182,242
1962	3,259	-	-	186,513	231	3	688,336
1963	3,326	-	-	+	87	2	+
1964	3,402	-	-	+	2	-	+
1965	3,480	238(5)	216(6)	1,630,000(6)	-	-	+

** See tables 21 and 24 for number of vaccinations administered in French West Africa.
(1) Source of vaccination data from 1940 through 1952: Breteau, H., Fievre Jaune en Afrique-Occidentale Francaise. Bull. W.H.O., 1954; 11, 453-481.
(2) Reported from Kedougou.
(3) Reported from Kolda and Tambacounda.
(4) Reported from Boulel
(5) Outbreak in Diourbel Region; See figure 17.
(6) Data on 140 deaths reported by P. Bres at the 6th Technical Conference of the OCCGE, Bobo-Dioulasso, March, 1966. See figures 17A, 17B and 17C.

FIGURE 17

YELLOW FEVER - SENEGAL, 1965

EPIDEMIC ZONE MAP

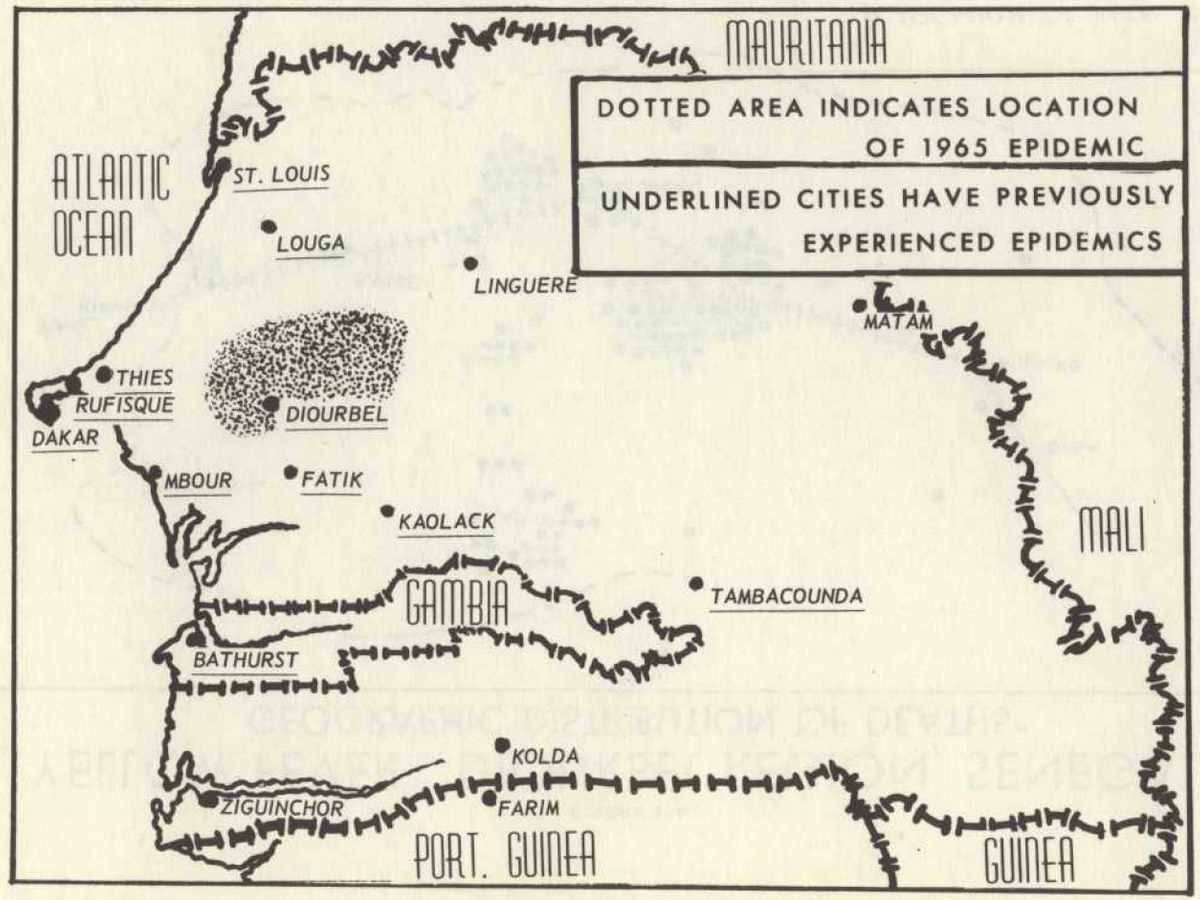
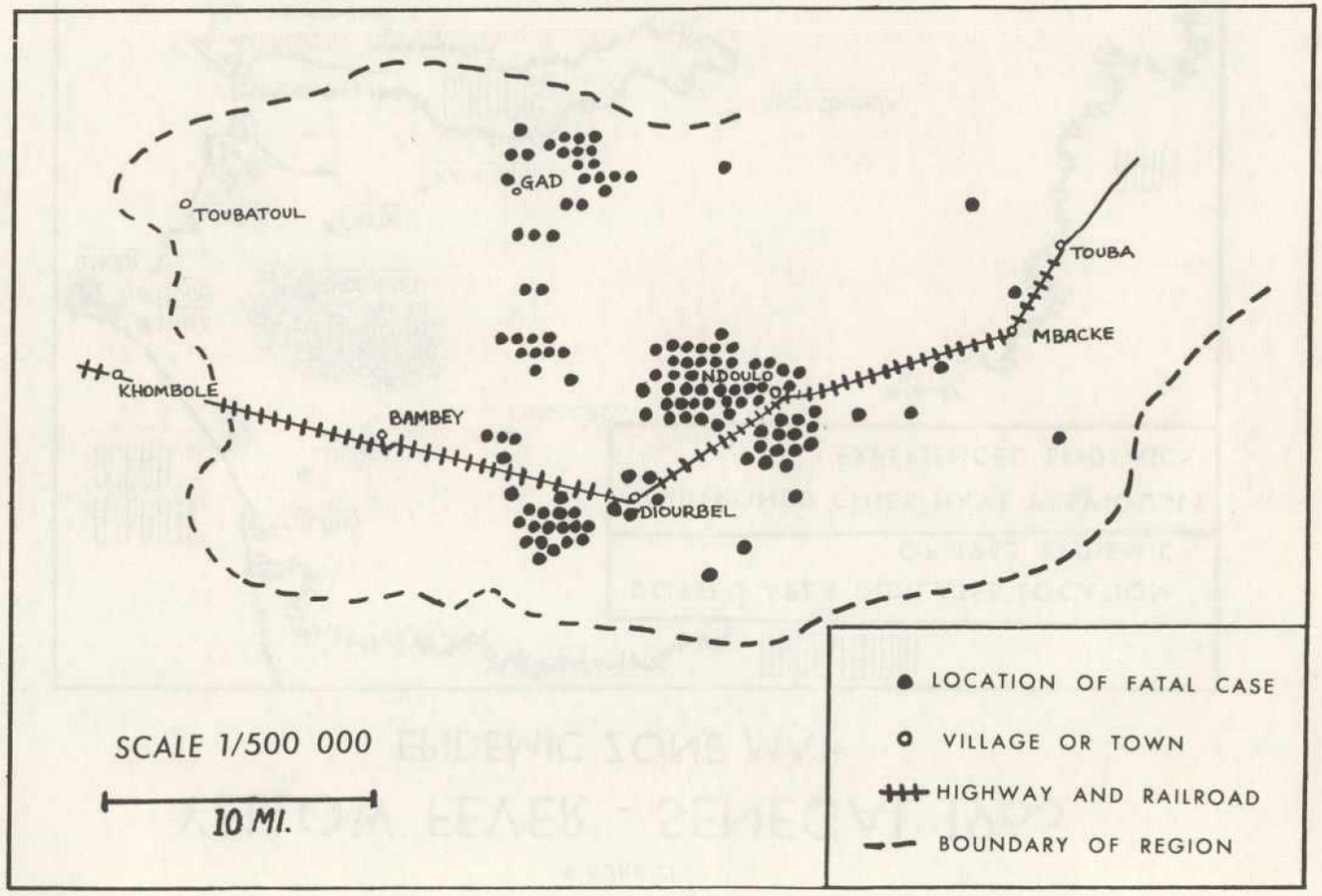


FIGURE 17A

YELLOW FEVER - DIOURBEL REGION, SENEGAL

GEOGRAPHIC DISTRIBUTION OF DEATHS*



*Excludes those with unknown geographic location.

FIGURE 17B

YELLOW FEVER - SENEGAL, 1965

DEATHS BY WEEK

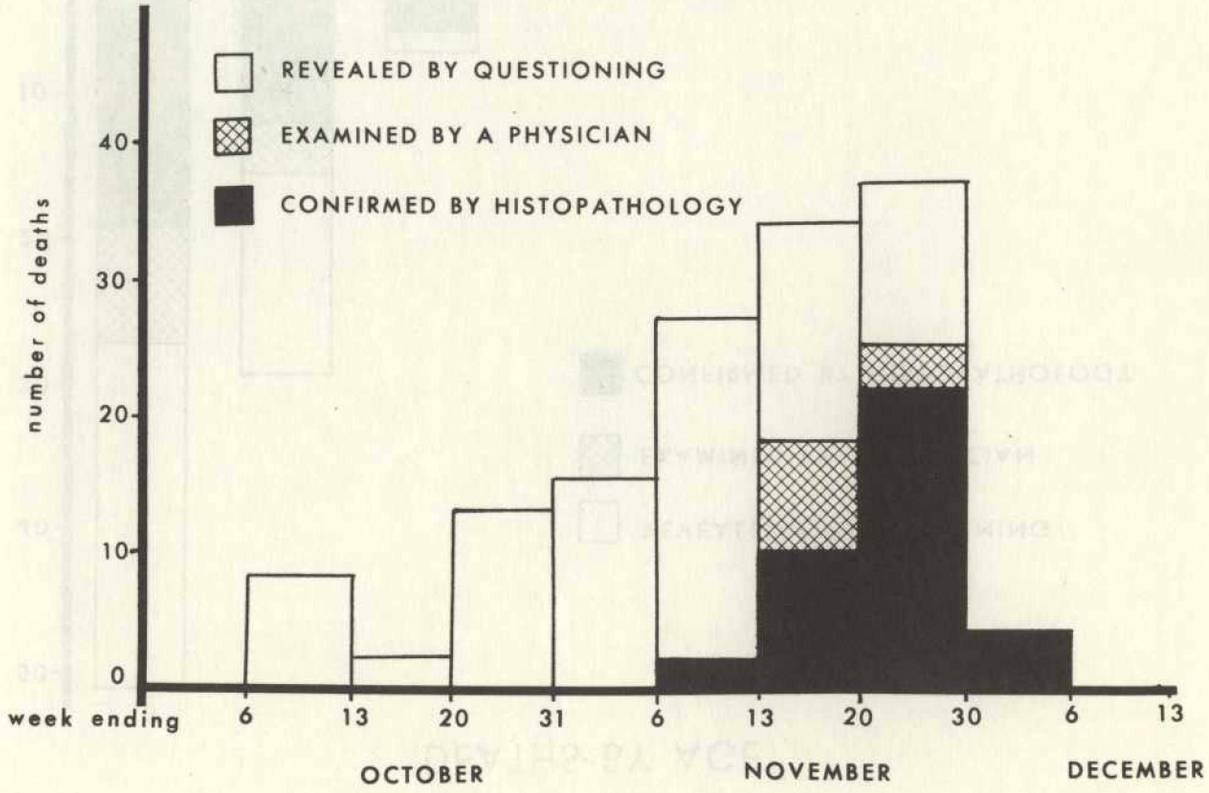
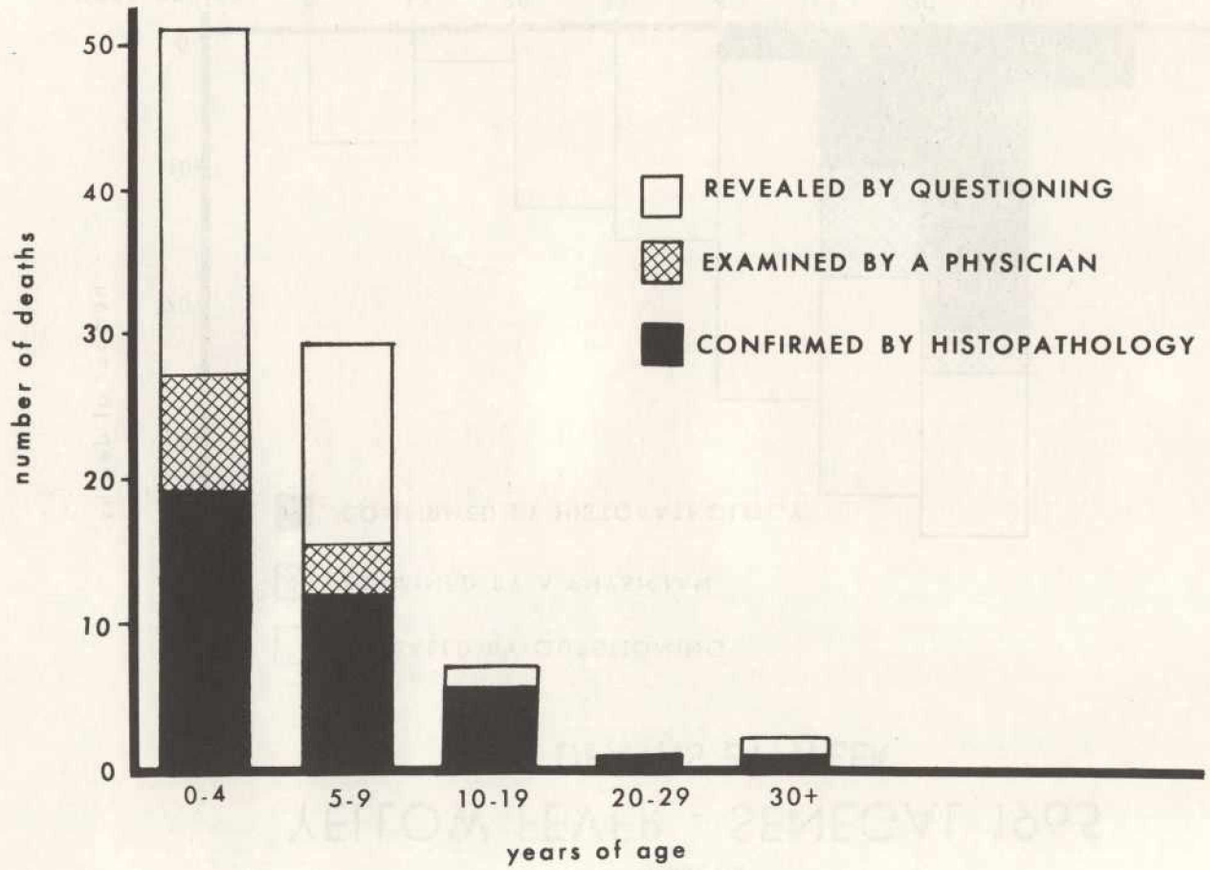


FIGURE 17C

YELLOW FEVER - SENEGAL, 1965

DEATHS BY AGE*



*Excludes cases with unknown age

Table 18

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Sierra Leone, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases	Deaths	Vaccinations	Cases	Deaths	Vaccinations
1940	1,368	-	-	...	29	...	...
1941	1,396	-	-	...	7	-	...
1942	1,424	3	2	...	8	...	...
1943	1,453	-	-	...	3	-	...
1944	1,483	-	-	...	484	96	...
1945	1,514	-	-	...	650	40	...
1946	1,545	-	-	...	750	114	...
1947	1,577	-	-	...	465	82	...
1948	1,609	-	-	...	200	30	...
1949	1,642	3(1)	1	...	157	2	...
1950	1,676	1(1)	1	...	40	1	...
1951	1,710	-	-	...	34	-	...
1952	1,745	-	-	...	36	1	...
1953	1,781	1	1	...	12	-	...
1954	1,817	3	1	2,829	5	-	62,209 108,966
1955	1,854	2	1	18,863	49	3	619,804
1956	1,892	-	-	2,293	946	19	922,242
1957	1,931	-	-	3,758(2)	4,846	228	835,644(3)
1958	1,970	-	-	4,215(2)	513	3	337,000(3)
1959	2,010	-	-	...	96	-	281,000(3)
1960	2,051	-	-	...	12	1	335,096(3)
1961	2,093	-	-	...	6	1	117,186(3)
1962	2,136	-	-	...	78	-	338,101(3)
1963	2,180	-	-	+	14	-	269,029(3)
1964	2,241	-	-	+	89	15	245,623(3)
1965	2,304	-	-	+	60	13	+

(1) Cases occurred in the vicinity of Kabala (District of Koinadugu) in December, 1949 and January, 1950: Bonnel, P.H. and Deutschman, Z., La Fievre Jaune en Afrique. Bull. W.H.O., 1954, 11, 325-389.
(2) Freetown only.
(3) Vaccination data from report by Dr. Hans Mayer, WHO Smallpox Consultant, June, 1965.

Table 19

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Togo, 1940-1965

Year	Population (000's)	Yellow Fever			Smallpox		
		Cases(1)	Deaths(1)	Vaccinations	Cases	Deaths	Vaccinations
1940	983	1	-	15,041(2)	13	5	...
1941	1,003	-	-	45,600(2)	1	-	...
1942	1,023	1	1	133,130(2)	-	-	...
1943	1,044	-	-	100,037(2)	-	-	...
1944	1,065	-	-	211,243(2)	174	22	...
1945	1,087	-	-	234,999(2)	535	37	...
1946	1,109	-	-	189,906(2)	470	31	...
1947	1,132	-	-	338,932(2)	65	1	...
1948	1,155	-	-	533,382(2)	107	20	...
1949	1,179	-	-	236,710(2)	152	24	...
1950	1,203	-	-	289,877(2)	147	16	...
1951	1,228	-	-	397,193(2)	190	42	...
1952	1,253	-	-	286,228(2)	628	59	...
1953	1,279	-	-	224,090(2)	228	14	...
1954	1,305	...	...	278,725	226	3	303,653
1955	1,332	...	...	98,187	2	-	108,897
1956	1,359	...	...	222,509	6	-	253,136
1957	1,387	...	...	304,898	9	2	304,690
1958	1,415	...	...	134,251	29	6	135,288
1959	1,444	...	...	120,205	66	8	120,527
1960	1,473	-	-	201,775	347	24	244,707
1961	1,503	-	-	227,666	281	22	344,881
1962	1,534	-	-	107,399	572	15	170,699
1963	1,565	-	-	+	274	14	+
1964	1,603	-	-	+	21	-	+
1965	1,641	-	-	+	13	-	+

(1) 1940-1953: Cases and deaths from Bonnel, P.H. and Deutschman, Z., La Fievre Jaune en Afrique. Bull. W.H.O., 1954, 11, 325-389.

(2) Durieux, C. Mass Yellow Fever Vaccination in French Africa South of the Sahara. WHO Monograph Series No. 30, 1956, 115-121; Geneva.

Table 20

Yellow Fever and Smallpox
Cases, Deaths and Vaccinations
Upper Volta, 1940-1965

Year	Population (000's)	Yellow Fever Cases[1]	Yellow Fever Deaths[1]	Yellow Fever Vaccinations	Smallpox Cases[5]	Smallpox Deaths[5]	Smallpox Vaccinations
1940	2,921	-	-	**	...	...	
1941	2,981	-	-	**	...	...	
1942	3,042	4	4	**	...	...	
1943	3,104	-	-	**	...	...	
1944	3,167	-	-	**	...	...	
1945	3,232	-	-	**	...	...	
1946	3,298	-	-	**	...	...	
1947	3,365	-	-	**	...	...	
1948	3,434	-	-	**	449	...	
1949	3,504	-	-	**	109	...	
1950	3,576	-	-	**	242	...	
1951	3,649	-	-	**	330	13	
1952	3,723	-	-	**	248	16	
1953	3,799	-	-	***	99	9	
1954	3,877	-	-	***	183	21	***
1955	3,956	-	-	***	363	32	***
1956	4,037	-	-	***	513	49	***
1957	4,119	-	-	***	1,658	231	***
1958	4,203	-	-	...	681	42	...
1959	4,289	-	-	...	368	6	...
1960	4,377	-	-	...	126	-	...
1961	4,466	-	-	508,275(2)	2,360	337	1,378,449
1962	4,557	-	-	367,572(2)	1,335	99	1,411,748
1963	4,650	-	-	291,057(2)	339	29	1,583,184
1964	4,762	-	-	488,397(3)	8	-	1,516,877(3)
1965	4,876	-	-	366,988(3,4)	14	-	1,121,044(3,4)

** 3,967,585 yellow fever vaccinations administered from 1939 through 1952: Same source as footnote (1).

*** See tables 21 and 22 for number of vaccinations administered in French West Africa.

(1) 1940-1947: Case and death data from Breteau, H. La Fievre Jaune en Afrique-Occidentale Francaise. Bull. W.H.O., 1954, 11, 435-481.

(2) Age 10 years and above.

(3) Vaccination data from Service des Grandes Endemies de Haute-Volta.

(4) Through October 1965.

(5) 1940-1947: included in data reported by Ivory Coast, Niger and Mali.

Table 21

Yellow Fever Vaccinations
Civilian Population, French West Africa*
1940 - 1957**

Year	Yellow Fever Vaccinations	Combined Smallpox-Yellow Fever Vaccinations	Total
1940	64,780	217,636	282,606
1941	370,999	1,082,966	1,453,965
1942	222,630	2,511,048	2,733,678
1943	401,974	2,397,019	2,798,993
1944	378,839	3,066,494	3,445,333
1945	475,379	2,262,496	2,737,875
1946	283,177	2,124,492	2,407,669
1947	491,187	2,161,369	2,752,556
1948	275,438	3,182,272	3,457,710
1949	113,301	4,011,914	4,125,215
1950	31,469	3,467,451	3,498,920
1951	96,145	3,757,611	3,853,756
1952	95,372	4,922,268	5,017,640
1953	...	...	4,071,538
1954	87,529	3,614,142	3,701,671
1955	119,847	4,098,479	4,218,326
1956	43,038	3,632,338	3,675,376
1957	...	3,523,136	3,523,136

* Includes Senegal, Mauritania, Mali, Niger, Upper Volta, Dahomey, Ivory Coast and Guinea.

** Source of Data:

1940 - 1952: Breteau, H. La Fievre Jaune en Afrique-Occidentale Francaise. Bull. W.H.O., 1954, 11, 435-481.

1953: Durieux, C. Mass Yellow Fever Vaccination in French Africa. WHO Monograph Series No. 30, 1956, 115-121; Geneva.

1954 - 1957: WHO World Health Statistics Annual, Vol. III, 1954, 1956, 1958.

Table 22

Yellow Fever Vaccinations
French Equatorial Africa*
1944 - 1957**

Year	Yellow Fever Vaccinations	Combined Smallpox-Yellow Fever Vaccinations	Total
1944	...	...	185,224
1945	...	...	90,226
1946	...	...	143,605
1947	...	...	885,438
1948	...	...	779,511
1949	...	...	794,588
1950	...	...	1,017,643
1951	...	...	880,757
1952	...	...	737,481
1953	...	...	720,844
1954	233,673	1,284,103	1,517,776
1955	258,331	1,304,366	1,562,697
1956	15,301	1,563,382	1,578,683
1957	...	822,447	822,447

* Includes Central African Republic, Chad, Congo (Brazzaville) and Gabon.

** Source of Data:

1944 - 1953: Durieux, C. Mass Yellow Fever Vaccination in French Africa. WHO Monograph Series No. 30, 1956, 115-121; Geneva.

1954 - 1957: WHO World Health Statistics Annual, Vol. III, 1954, 1956, 1958.

TABLE 23

Serological Immunity to Yellow Fever
By Country, French West Africa
1931 - 1940 and 1952 - 1953*

Country	Specimens Collected 1931 - 1940		Cumulative No. of Vaccinations** 1939 - 1952	Specimens Collected 1952 - 1953	
	No. of Bloods Studied	Percent Positive		No. of Bloods Studied	Percent Positive
Senegal	1,778	22 %	5,820,441	50	98.0 %
(Dakar)	560	17	***	415	81.4
Mauritania	0	-	440,982	24	83.3
Mali	645	26	6,090,178	21	81.0
Niger	481	24	3,266,510	49	95.9
Upper Volta	0	-	3,967,585	35	88.6
Dahomey	188	33	5,045,266	31	83.9
Ivory Coast	511	12	8,229,474	83	98.8
Guinea	206	5	5,807,113	45	84.4
TOTAL	4,369	20 %	38,667,549	753	86.0 %

*Source of Data: Breteau, H. La Fievre Jaune en Afrique-Occidentale Francaise. Bull. W.H.O., 1954, 11, 435-481.

**Total vaccinations, includes both yellow fever vaccination and combined smallpox-yellow fever vaccinations.

***Included in figures for Senegal.

Table 24

Smallpox Vaccinations
French West Africa*
1954 - 1957

Year	Smallpox Vaccinations	Combined Smallpox-Yellow Fever Vaccinations	Total
1954	1,625,518	3,614,142	5,239,660
1955	3,452,587	4,098,479	7,551,066
1956	1,829,564	3,632,338	5,461,902
1957	2,491,734	3,523,136	6,014,870

* Includes Senegal, Mauritania, Mali, Niger, Upper Volta, Dahomey, Ivory Coast and Guinea.

Table 25

Smallpox Vaccinations
French Equatorial Africa*
1954 - 1956

Year	Smallpox Vaccinations	Combined Smallpox-Yellow Fever Vaccinations	Total
1954	624,075	1,284,103	1,908,178
1955	618,847	1,324,366	1,943,213
1956	137,863	1,563,382	1,701,245

* Includes Central African Republic, Chad, Congo (Brazzaville), and Gabon.

APPENDIX I

SOURCES OF DATA

Morbidity and Mortality Data

1940-1946: WHO Annual Epidemiological and Vital Statistics; Vol. 1, Part II (1952).

1947-1949: WHO Annual Epidemiological and Vital Statistics; Vol. 2, Part II (1953).

1940-1950: WHO Epidemiological Vital Statistics Report, 1953, 6; 227-256.
WHO Epidemiological Vital Statistics Report, 1955, 8: 359-434.

1950-1961: WHO Annual Epidemiological and Vital Statistics; Volumes 3-14, Part II, for respective year.

1951-1963: WHO Epidemiological Vital Statistics Report, 1964, 17: 501-530.

1962-1965: WHO World Health Statistics Annual, 1962; Volume II (1965).
WHO Weekly Epidemiological Record, 1966, 41: 269-288.
WHO Weekly Epidemiological Record, 1966, 41: 369-384.

Vaccination Data

1940-1953: As footnoted.

1954-1960: WHO Annual Epidemiological and Vital Statistics; Volumes 7, 9, 11,13; Part III, for respective volume.

1961-1963: WHO World Health Statistics Annual, 1962; Volume II (1965).

1964-1965: As footnoted.

Population Data

1964-1965: Projections based on 1963 population reported in the 1964 U.N. Demographic Yearbook and average annual rate of increase.

1963: Source - U.N. Demographic Yearbook, 1964.

1940-1962: Reliable estimates prior to 1963 for most of the 19 countries are not available. Therefore, for uniformity and to present the approximate magnitude of denominator data, populations have been reduced 2 percent annually using 1963 as the base year.

APPENDIX II

Symbols Used in Tables

For uniformity in the presentation of data, the symbols used in the statistical publications of the World Health Organization and United Nations will be used here.

Symbols Used in Tables

* Preliminary, approximate or estimated data.
... Data not available.
\+ Data not yet available.[1]
\- Nil or magnitude negligible.
0.0 Magnitude less than half of unit employed.
x Unofficial data (or estimate).
. Category not applicable.
r Revised data.[1]
i Imported Cases.
C Cases notified to health authorities.
D Deaths registered to health authorities.
D. Deaths registered by the Central Statistical Services on the basis of death certificates.
o In-patients.
ø Out-patients of hospitals or dispensaries.

[1] These signs do not appear in the United Nations list of symbols. They are peculiar to WHO and indicate: + that the information in question may be published at some future time, as it will be furnished by the country in question, but has not yet been communicated to the Organization; and [r] that a more accurate figure has been substituted for the preliminary figure previously published.

Explication des signes

* Donnee preliminaire, approximative ou estimative.
... Donnee non disponible.
\+ Donnee non encore disponible.[1]
\- Zero ou quantite negligeable.
0.0 Quantite inferieure a la moitie de l'unite employee.
x Donnee (ou estimation) non officielle.
. Categorie non applicable.
r Donnee revisee.[1]
i Cas importes.
C Cas declares aux autorites sanitaires.
D Deces enregistres aux autorites sanitaires.
D. Deces enregistres par le Service central de statistique d'apres les certificats de deces.
o Malades hospitalises.
ø Malades consultants des hopitaux ou des dispensaires.

[1] Ces signes ne figurent pas dans la liste des symboles des Nations Unies. Ils sont particuliers a l'OMS et signifient: + que le renseignement en question pourra etre publie un jour car il sera fourni par le pays en question, mais qu'il n'a pas encore ete communique a notre Organisation; [r] qu'un chiffre plus exact a ete substitue a celui - preliminaire - qui avait ete publie precedemment.