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Poliomyelitis: Southern Rhodesia, 1957

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The year 1957 was, without doubt, poliomyelitis year in the calendars of medicine and public health in the Federation. Apart from the very high incidence of the disease throughout Southern Africa, the epidemic in S. Rhodesia was of great interest and reveals many points of epidemiological importance. Of even wider interest is the account of a vigorous poliomyelitis vaccination campaign pursued in the face of a rising incidence of the disease.

Previous Experience

Acute anterior poliomyelitis has been recognised and recorded in S. Rhodesia for very many years. It has been recognised that the disease has always had a higher incidence in the non-African, particularly the European section of the population, but that nevertheless paralytic forms of the disease did occur in the African people as gauged by patients showing typical residual paralyses with wasting.

Table I sets out the number of cases notified in each year, the deaths occurring and the incidence per 100,000 of the population in both the African and non-African people of S. Rhodesia. Included in the non-African group throughout are not only the Europeans but the Coloured and Asian people of S. Rhodesia who

Table I

Poliomyelitis Incidence and Deaths, 1945-57

Year	*Non-African*			*African*		
	Cases	*Deaths*	*Incidence per* 100,000	*Cases*	*Deaths*	*Incidence per* 100,000
1945	9	1	10.3	12	1	0.7
1946	31	4	33.9	17	1	1.0
1947	8	0	8.3	3	1	0.2
1948	15	4	13.7	10	0	0.5
1949	10	1	8.2	5	0	0.3
1950	37	11	27.5	22	2	1.1
1945-1950	110	21	17.0	69	5	0.6
1951	99	12	66.7	69	2	3.5
1952	57	9	35.0	42	5	2.1
1953	16	3	9.4	8	3	0.4
1954	107	8	62.6	63	8	2.9
1955	92	5	51.2	55	7	2.5
1956	48	4	25.1	26	0	1.1
1951-1956	419	41	41.6	263	25	2.1
1957	207	19	100.0	456	24	19.4

Table II

Poliomyelitis Cases, 1951-52 and 1954-55

Month	1951-52			1954-55		
	Non-African	*African*	*Total*	*Non-African*	*African*	*Total*
October	21	18	39	13	13	26
November	19	11	30	32	14	46
December	17	17	34	47	21	68
January	17	10	27	38	18	56
February	5	10	15	22	10	32
March	10	5	15	9	5	14
TOTAL	89	71	160	161	81	242

constitute a small group, 13,900 strong in 1957 as compared with 193,000 Europeans. It is clear that the non-African group has always had more cases of poliomyelitis than the numerically much larger African population in all years from 1946 to 1956. The incidence rates per 100,000 show that in the period 1945-50 the African rate was only 1/28 of the European rate, in 1951-56 1/19, and finally in 1957 1/5, and in numbers more than double the number of cases notified in the non-African group.

The fatality ratio per 100 notifications has shown a striking fall over the years; it was 19.9 in 1945-50, 9.7 in 1951-56 and 9.2 in 1957 in the non-African group, while the comparable figures in the African group are 7.2, 9.5 and 5.3 respectively, all lower than the non-African ratios.

It is interesting to compare the notification rates of the non-African group with rates reported from other countries in years of high incidence of the disease:—

Denmark (1952): 5,676 cases, 131.0 notifications per 100,000 of the population;
United States (1953): 57,879 cases, 36.6;
Canada (1953): 8,888 cases, 60.2;
England and Wales (1953): 4,547 cases, 10.3;
Sweden (1953): 5,090 cases, 71.0; and
England and Wales (1955): 6,331 cases, 14.2 notifications per 100,000 of the population.

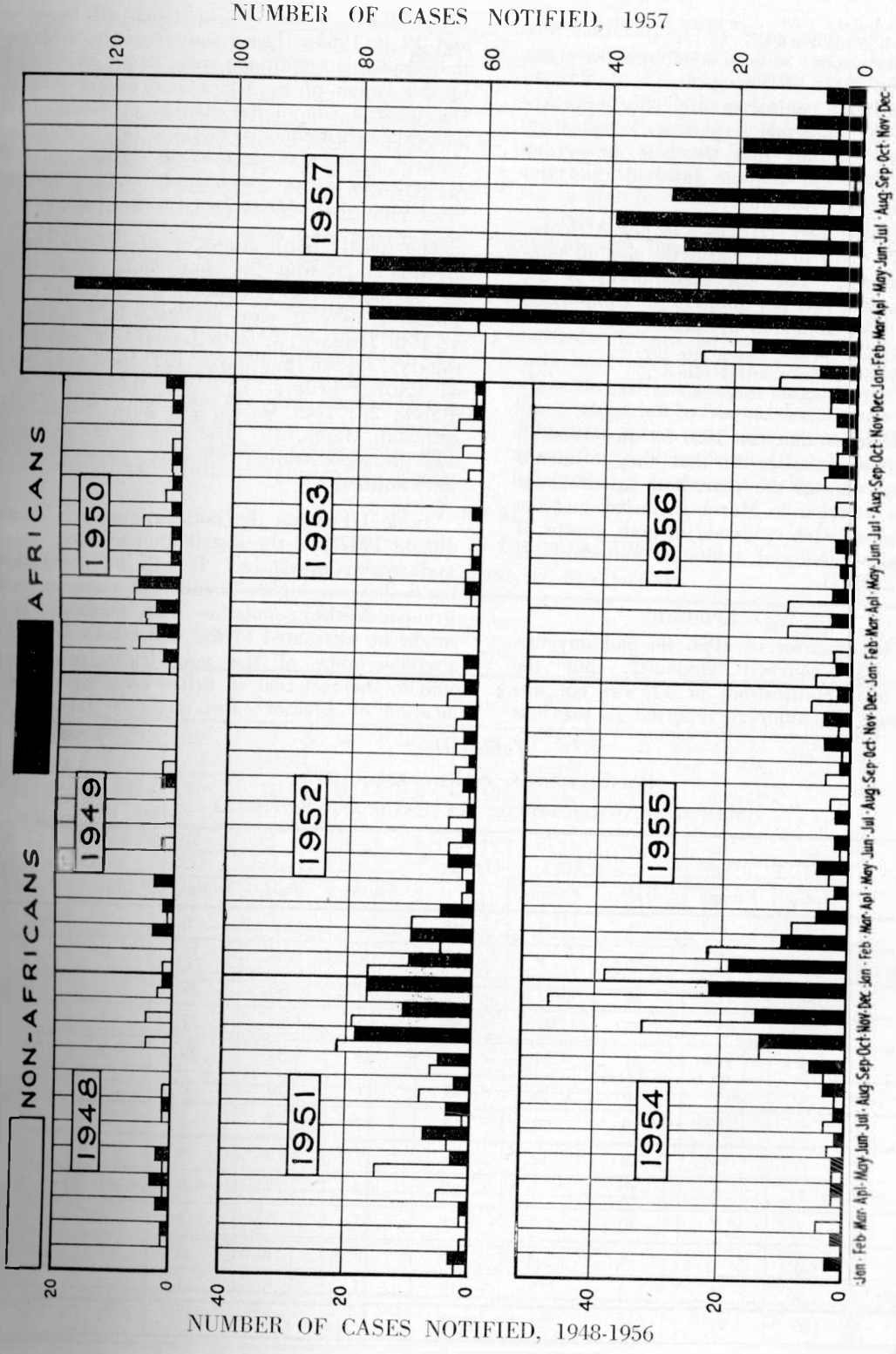
Measured against these standards, the incidence in S. Rhodesia in non-Africans has been of a high order, particularly in 1951-52 and 1954-55. The monthly notification of cases in the years 1948-57 are recorded in Graph 1. It will be seen that each epidemic phase has affected both groups of the population and that, with the exception of the 1957 outbreak, the curves of development and recession of the epidemics were relatively symmetrical for both groups and occurred at the same times.

It is interesting to note that the average notified cases per 100,000 of the population of the United States of America, 1951-55, is quoted as 24. In S. Rhodesia in 1957 there was a total of 663 notified cases in a mid-year population estimated to be 2,556,900, a case notification rate of 25.8 per 100,000. This seems to indicate that the United States average rate is close to the S. Rhodesia epidemic year rate. An effort was made in both 1951 and 1954 epidemics to get the fullest possible details, particularly of the non-African cases. In 1951, 99 cases were notified, 55 in males, resulting in five deaths; and 44 in females, resulting in seven deaths. There were 80 paralytic cases, which is a high proportion; the experience in England and Wales is that a paralytic/non-paralytic ratio is generally 6: 4. The age distribution of cases and the attack rate per 100,000 was estimated as follows:—

0— 4 years, 46 cases, attack rate 267;
5— 9 years, 19 cases, attack rate 140;
10—19 years, 13 cases, attack rate 75; and
over 20 years, 21 cases, attack rate 24.

S. Rhodesia had experienced from 1946 an unprecedented immigration of Europeans. In fact, the European population of 1945 had doubled itself by 1954. It was decided to enquire into the residential status of the cases notified. Taking 1946 as the dividing line, it would seem in the 1951 epidemic that "old Rhodesians" and children born to this group had a lower incidence than was experienced by "new Rhodesians" from Europe and children born to this group. If the immigrants from S. Africa and children born to them are included in the "old Rhodesians" group, the cases and incidence rates were found to be:—

POLIOMYELITIS: SOUTHERN RHODESIA, 1957



Graph 1

MONTHLY NOTIFICATIONS, POLIOMYELITIS, SOUTHERN RHODESIA, 1948-1957

"Old Rhodesians": 63 cases in an estimated 112,000 people—56 per 100,000.
"New Rhodesians": 36 cases in an estimated 26,000 people—138 per 100,000.

The population estimates are only approximate, but the epidemic experience seemed to show fairly definitely that the new immigrant was more liable to become infected than the residents of longer standing.

In 1954 there were 110 cases in non-Africans, of which 70 were of the paralytic and 40 non-paralytic forms. The age distribution of the cases and attack rate per 100,000 for comparison with 1951 was estimated as follows:—

0— 4 years, 38 cases, attack rate 182;
5— 9 years, 17 cases, attack rate 87;
10—19 years, 17 cases, attack rate 72; and
over 20 years, 38 cases, attack rate 35.

Graph 1 shows that the 1951-52 and 1954-55 epidemics were similar in that they occurred at the same time of the year, both lasted about six months, October to March inclusive, and the rise and fall of each epidemic in both groups of the population followed a similar pattern as is shown in Table II.

The 1957 Epidemic

In the last quarter of 1956 the poliomyelitis situation was watched anxiously, but the quarter's total notifications at 17 was not dissimilar from the numbers reported in previous non-epidemic years—16 in 1952, 10 in 1953 and 19 in 1955. There was, however, evidence that epidemic conditions were being established in the Union of S. Africa and by the end of December a rise in the number of notifications was expected daily. In fact, the rise in notification of cases was delayed until the end of January, 1957, by which time the epidemic in the Union of S. Africa had reached high levels.

The weekly notifications of all cases of poliomyelitis in S. Rhodesia show more clearly how the incidence rise developed: week ending 5th January, 1957, 1 case notified; 12th January, 3; 19th January, 3; 26th January, 5; 2nd Februauary, 7; 9th February, 10; 16th February, 4; 23rd February, 12; 2nd March, 10; 9th March, 20; 16th March, 24; 23rd March, 42; and 30th March, 41. The peak of the epidemic was the week ending 5th May, when 47 cases were notified.

Table III shows the notifications each month during 1957 and the distribution by races, sexes and health provinces. It will be noted that males have a higher number of cases in both groups of the population than females. This might be attributed to the well known male sex preponderance of the non-African population and to the fact that in urban areas where notification of African cases might be expected to

Table III

Poliomyelitis, S. Rhodesia, 1957

Monthly Notifications, Sex Ratio and Provinces

Month	*Non-African*		*African*		*Total*	*Provinces*				
	Male	*Female*	*Male*	*Female*		*North*	*West*	*Midlands*	*East*	*S.-East*
January	7	6	3	3	19	8	2	6	1	2
February	17	8	8	9	42	19	8	11	0	4
March	30	31	41	37	139	50	50	35	1	3
April	31	23	59	67	180	62	69	37	7	5
May	15	11	51	27	104	48	34	19	3	0
June	4	1	15	13	33	12	10	3	4	4
July	3	2	19	20	44	27	7	3	7	0
August	2	3	18	12	35	19	5	9	2	0
September	1	0	12	7	20	12	7	0	1	0
October	2	2	10	9	23	7	7	5	4	0
November	3	1	5	5	14	6	6	2	0	0
December	1	3	4	2	10	1	6	1	1	1
1957	116	91	245	211	663	271	211	131	31	19

be more complete, there is undoubtedly a male preponderance. Nevertheless it is interesting to note that in England and Wales in 1955, a year of high polio incidence, the notified case incidences of both paralytic and non-paralytic poliomyelitis per 100,000 were higher in males than females at all age groups. The table shows that the peak of the epidemic in the non-African group was reached in March and thereafter soon fell away, and only five cases were reported in each of the months June to August. The epidemic in the African population did not reach its peak until the month of April. Far from showing the rapid fall-away in incidence of notifications, as had the non-African group, the decline of the epidemic was prolonged. The months before and after the peak month, March and May, showed each 78 cases, and it was not until November that African notifications had fallen below the February figure of 17 cases.

The notifications by provinces does not show any very significant points and it has been impossible to break down the population of the Colony to show the rates per 100,000 in each province. It will be noted from Table III that the rise in incidence in Western Province, whose centre is Bulawayo, was delayed until the abrupt rise in March.

Table IV shows the number of cases by age groups and the deaths resulting. The deaths occurring are given in brackets below each monthly entry and these have been related in each case to the month in which the case was notified. It will be seen that the non-African cases have been divided into six age groupings, while the African cases are grouped into only four categories. The African ages are more difficult to assess and there seems little point in attempting a more detailed break down. It will be noted that in the non-African group one-third

Table IV

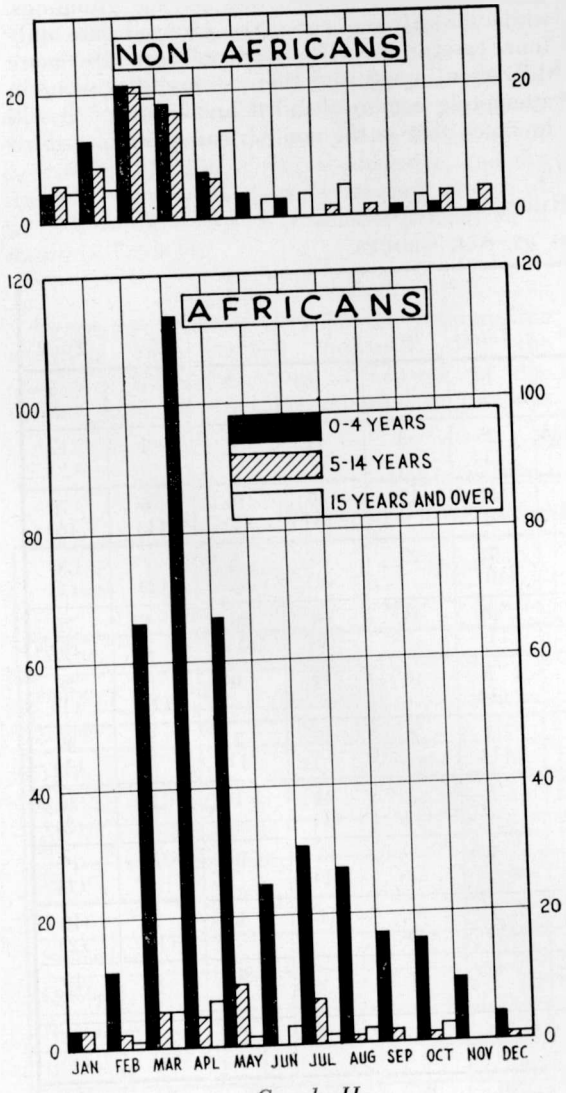
Poliomyelitis, S. Rhodesia, 1957

Monthly Notificatons by Age Groups

Month	*Non-African*							*African*				
	0—	1—	5—	10—	15—	20+	*Total*	0—	1—	5—	15+	*Total*
January	0	4	5 (1)	0	0	4	13 (1)	0	3	3	0	6
February	2	10	7 (1)	1	2	3	25 (1)	3	11	2	1	17
March	4	17	11 (1)	10	9 (1)	10 (1)	61 (3)	17 (1)	49 (3)	6 (1)	6 (1)	78 (6)
April	2	16 (1)	12 (1)	5 (1)	2	17 (7)	54 (10)	25	89 (3)	5	7 (1)	126 (4)
May	1	6	3	3	2	11 (1)	26 (1)	13	54 (5)	10 (1)	1	78 (6)
June	1	2 (1)	0	0	2	0	5 (1)	6	19	0	3 (1)	28 (1)
July	0	2	0	0	1	2 (1)	5 (1)	6	25	7 (1)	1	39 (1)
August	0	0	1	0	2	2	5	3 (1)	24 (1)	1	2	30 (2)
September	0	0	1	0	0	0	1	4	13 (1)	2	0	19 (1)
October	0	1	0	0	1	2 (1)	4 (1)	5 (1)	11	1	2 (1)	19 (2)
November	0	1	1	2	0	0	4	3	7	0	0	10
December	0	1	3	0	0	0	4	2	2	1	1 (1)	6 (1)
TOTAL	10	60 (2)	44 (4)	21 (1)	21 (1)	51 (11)	207 (19)	87 (3)	307 (13)	38 (3)	24 (5)	456 (24)

of the cases were under the age of five years, while in the African group 86 per cent. were under this age. Comparing the cases at age fifteen years and over, a third of the cases in the non-African group were over this age, while in the African group only 5 per cent. were over the age of fifteen years. The highest case fatality ratios were also experienced in the over fifteen group—one in six in the non-African and one in five in the African. The combined case fatality ratio for S. Rhodesia in 1957 is 6.5 deaths per 100 notifications, which can be compared with 4.3 in England and Wales in 1955. In the non-African population the notified case incidence per 100,000 in each age group is as follows:—

0— 4 years, 70 cases, 278/100,000;
5— 9 years, 44 cases, 186/100,000;
10—14 years, 21 cases, 130/100,000;
15—19 years, 21 cases, 172/100,000; and
20 years and over, 51 cases, 39/100,000, giving an over-all incidence on notifications of almost exactly 100 per 100,000 of the population.



Graph II
Incidence of Poliomyelitis by Ages

Graph II shows more graphically the burden of the attack borne by the African children up to five years of age and illustrates that the persistence of the epidemic into the second half of 1957 was chiefly due to high incidence in this age group.

It is interesting now to turn to study the proportion of paralytic cases notified to non-paralytic cases. As has already been stated, experience in England and Wales shows that in years of high incidence 60 per cent. were paralytic, the remainder non-paralytic. In S. Rhodesia in 1957, 54.6 per cent. of all non-African cases notified were recorded as paralytic.

Table V gives the notification of paralytic and non-paralytic cases by racial groups and each month in 1957. This shows very clearly that notifications of poliomyelitis in Africans is essentially notification of paralytic cases only. There are a number of authorities who feel that in view of the number of cases of illness with pyrexia which may in periods of high poliomyelitis incidence be classed as non-paralytic cases, it is preferable to consider the disease purely from the paralytic accident point of view. It is so difficult to decide clinically whether a given patient is suffering from non-paralytic polio or from some other cause of pyrexia, myalgia and upper respiratory tract illness that there is some merit in limiting consideration only to paralytic cases. On this basis the non-African population of S. Rhodesia had a paralytic poliomyelitis incidence rate of 54.6 per 100,000 and the comparable rate in the African group was 18.8.

Table VI gives a break-down of the non-African polio cases by age groups, sexes and whether paralytic or otherwise and shows that there is little evidence that sex or age had an effect on the incidence of paralytic attack save that in both males and females under five years of age there is a distinctly higher proportion of paralytic cases. This may, of course, be in part due to the difficulties in the diagnosis of a non-paralytic case in a young child.

An attempt was made to classify the African cases notified into one of two groups, urban and

Table V

Poliomyelitis, S. Rhodesia, 1957

Paralytic and Non-Paralytic Cases Notified

Month	*Non-African*		*African*	
	Paralytic	*Non-Paralytic*	*Paralytic*	*Non-Paralytic*
January	10	3	6	0
February	11	14	17	0
March	30	31	73	5
April	31	23	118	8
May	12	14	78	0
June	4	1	28	0
July	3	2	39	0
August	5	0	30	0
September	0	1	19	0
October	4	0	19	0
November	2	2	10	0
December	1	3	6	0
1957	113	94	443	13

rural. Each African case notified was allotted to one or other of these categories, including in the urban group not only those cases living in African townships with a piped water supply and sewered drainage, but also cases reported from the larger mines where the standards of water supply and sanitation were of urban standards. Rural cases included all Africans living in reserves and on farms where water supply and sanitary arrangements would be expected to be on a more primitive level.

Graph III shows the monthly notifications of African cases grouped on this basis. This shows the more rapid build up of the epidemic in urban areas; the urban epidemic being practically over in May, while the rural epidemic reached its peak later and persisted for five months.

In previous periods of high incidence of poliomyelitis the epidemic of African cases was usually confined to the larger towns and mining townships, with only a few cases notified in rural areas, many being linked with recent visits to urban areas where cases had been reported. In 1957 the epidemic in the African population was explosive and appeared to permeate rural areas and produced numbers of paralytic cases in a population which had been considered reasonably protected at an early age by cryptic attacks of the disease.

Poliomyelitis Vaccination

In the latter part of 1955 enquiries were made into the possibility of obtaining supplies of poliomyelitis vaccine. It was soon clear at that time that producer countries were having difficulty in satisfying their own internal urgent needs. Early in 1956 it was learnt that the Poliomyelitis Foundation in Johannesburg was planning to manufacture vaccine and was prepared to make available limited supplies to the Federation as a token of gratitude for the very generous financial support given when the Polio Foundation was established.

The medical profession and the public were asked to furnish an indication of their needs of vaccine so that the laboratories at Johannesburg would have some indication of the demand. The offer was confined to vaccine for the protection of children one to five years inclusive, doctors and nurses and their families likely to be exposed to a higher risk of infection, and finally recent immigrants from north-west Europe. The demand for vaccine was very small and it was finally necessary to set a time limit for applications in May, 1956. The Poliomyelitis Foundation were then informed that the parents of 2,500 children in S. Rhodesia wished to avail themselves of the offer of vaccine and the first doses were duly delivered in August. Between May and August a number of late requests had

been received and the opportunity was seized to import 4,320 c.c. of British vaccine (Polivirin), which enabled 2,160 children to receive two inoculations between September and the end of 1956. In fact, this was the only group who had received a reasonable protection against poliomyelitis by the administration of vaccine, because unfortunately the S. African Polio Foundation found themselves unable to supply any material for second doses of vaccine to the 2,500 children inoculated in early September. Supplies of vaccine from the United States seemed to be unlikely in view of their rigid export permit arrangements. On 1st March, 1957, a full statement on the epidemic situation in the Federation was supplied through United States diplomatic channels, giving details of the groups it was thought should be protected. It was clearly understood that American vaccine would have to be paid for by the Government, but it was not known what restrictions as to issue to private practitioners and use by other than priority groups would be imposed. In fact, no answer was received for nearly two months, by which time a very large amount of vaccine had been imported from Great Britain. On 12th March, 1957, the manufacturers of Polivirin offered to supply a large quantity of vaccine immediately and this was received by the Federal Ministry of Health and issued to doctors for immediate use. Further consignments were received by air freight, and between 23rd March and 22nd May, 134,201 c.c. were imported. Except for 23,877 doses used for the protection of African children aged one to five years, this was issued for use in the protection of non-African children aged one to fifteen years and certain groups at high risk—for example, doctors and nurses, and particularly nursing staff at isolation hospitals caring for poliomyelitis cases.

From August, 1956, to December, 1957, the imports of vaccine are set out in Table VII. It will be clear that the Ministry of Health was the principal importer and that Great Britain furnished the bulk of the vaccine used. The Ministry laid down the following guiding rules for the vaccine imported under its auspices:—

(a) For giving two inoculations of 1 c.c. each to European, Coloured and Asian children one to fifteen years of age.

(b) Staff of hospitals and medical practitioners and their families who might be considered to be exposed to a higher than normal risk.

(c) From May, 1957, African children aged one to five years who were living in urban or semi-urban conditions.

The great majority of the children in group (a) above were treated by their private medical attendants, who were supplied with vaccine at cost price. The Government and local authorities inoculated the persons for whom they were

Table VI

Poliomyelitis, S. Rhodesia, 1957

Paralytic and Non-Paralytic Cases in Non-Africans

Sex and Age Group	*Paralytic Cases*	*Non-Paralytic Cases*	*All Cases*
Males: 0— 4 years	28	14	42
5— 9 years	9	16	25
10—14 years	4	9	13
15—24 years	11	6	17
Over 25 years	11	8	19
TOTAL MALES	63	53	116
Females: 0— 4 years	20	8	28
5— 9 years	10	9	19
10—14 years	3	5	8
15—24 years	7	10	17
Over 25 years	10	9	19
TOTAL FEMALES	50	41	91
TOTAL NON-AFRICANS	113	94	207
TOTAL AFRICANS	443	13	456

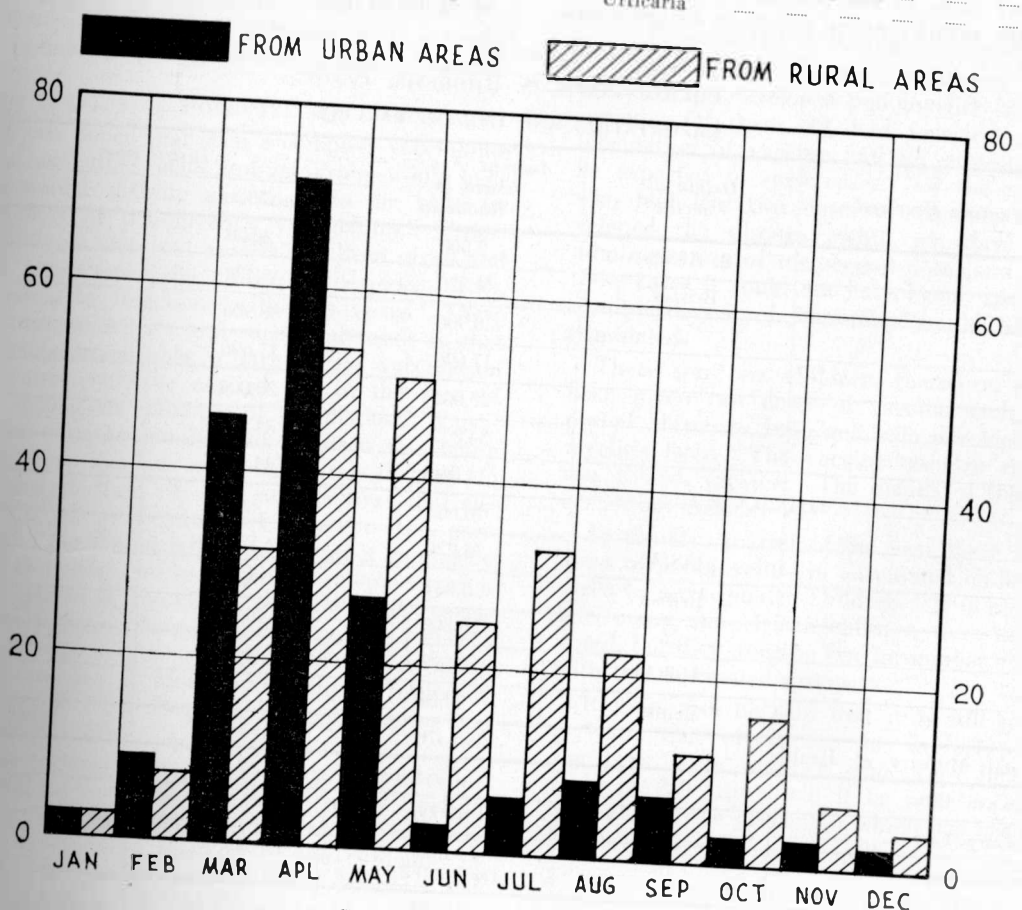
responsible by means of their own medical officers, and this was generally without any charge.

In May, 1957, the Federal Ministry of Health agreed to the operation of subsidised poliomyelitis vaccination schemes, where the Government provided the local authority with vaccine at half nett landed cost for the operation of schemes employing their own medical officers. The subsidised schemes were restricted to giving two inoculations to European, Coloured and Asian children one to fifteen years of age and to African children one to five years of age. The African scheme was extended to embrace a subsidised scheme for large employers of Africans who had their own medical services.

It will be noted that the vaccination campaign which was begun in March coincided with the development of the peak of the epidemic. During this period it is generally agreed that polio vaccination and in fact all inoculation procedures should be suspended. The suppliers of the British vaccine were particularly interested to learn of any unfavourable reactions to vaccination during an epidemic phase and, with the co-operation of 73 medical practitioners in S. Rhodesia, reports were submitted on the reactions experienced. There was general agreement that the reactions to inoculation were of little significance and few persons were affected.

Information was submitted by 73 doctors on 15,126 patients. No reactions in any of their patients were noted by 46 doctors. The remaining doctors described 71 patients as having mild symptoms, most of which were attributed to intercurrent conditions. The following were recorded as attributable to vaccination:—

Local swelling and tenderness	9
Pyrexia	27
Headache	12
Pyrexia with other symptoms	21
Urticaria	5



Graph 3.—Poliomyelitis
Incidence of African Cases in Urban and Rural Areas

This enquiry also recorded the age grouping of the persons inoculated with vaccine:—

813 were infants;
5,208 aged 1 to 5 years;
4,672 aged 6 to 10 years;
3,114 aged 11 to 15 years;
622 aged 16 to 20 years; and
677 aged 21 years and over.

If this record in the practice of 73 doctors represents the general picture, then it would appear that less than 15 per cent. of the vaccine was given to persons not in the priority group. The 1956 census showed that 31.6 per cent. of the European population was in the age group under 15 years of age. If this proportion can be accepted as roughly equivalent to the proportion of European, Coloured and Asian people aged one to fifteen years inclusive, the number in 1957 would be 65,190. A total of 171,559 c.c. is enough for two inoculations to 85,779 persons. If 15 per cent. of the persons inoculated were not in the priority group of one to fifteen years, then it would seem probable that 72,913 persons in the priority group could have been inoculated. As in fact there are only 65,000, it seems likely that everyone in the priority group of the non-African population could have received two inoculations of polio vaccine.

Vaccination of the African priority group, children one to five years of age living in urban and semi-urban conditions, did not begin until May. Local authorities chose different methods of financing the operation. Some gave the vaccine free of charge and did not recoup themselves of the 50 per cent. of the cost which they had to meet. Many authorities levied a nominal charge, such as sixpence per inoculation. The Federal Ministry of Health itself acts as a local health authority in certain semi-urban areas and adopted the policy of charging sixpence for each inoculation. It was soon found that while there was good response to the offer and a turn-out of children to receive the first inoculation, the

Table VII

Poliomyelitis, S. Rhodesia, 1957

Importation and Use of Vaccine

Vaccine Received	*Origin of Vaccine*	*Amount in c.c.s Issued in S. Rhodesia*	*Distribution*	
			Non-African	*African*
29.8.56	S. Africa	2,500	2,500	—
30.8.56	British	4,320	4,320	—
23.3.57	„	30,906	30,906	—
30.3.57	„	17,696	17,696	—
10.4.57	„	20,004	20,004	—
17.4.57	„	34,872	34,872	—
8.5.57	„	14,060	14,015	45
22.5.57	„	16,663	5,059	11,604
21.6.57	U.S.A.	14,220	1,992	12,228
26.7.57	British	3,837	3,453	384
7.9.57	„	10,200	10,104	96
16.9.57	U.S.A.	23,598	18,087	5,511
6.12.57	British	2,502	—	—
Total Ministry of Health		195,378	163,008	29,868
Bulawayo City	U.S.A.	7,551	7,551	—
Salisbury City	„	5,000	—	—
Personal imports	„	1,000 (estimated)	1,000	—
Other imports		13,551	8,551	—
TOTAL		208,929	171,559	29,868

numbers reporting six to eight weeks later for the second dose were most disappointing. In all but a few areas less than 50 per cent. of the children who had attended for the first dose reported for the second dose. In an effort to improve attendance at the second inoculation sessions, the practice was adopted of collecting the fee of a shilling for two doses from each patient at his first attendance. This, in fact, did little to encourage Africans to attend for the second dose.

In December, 1957, poliomyelitis vaccine became available in S. Rhodesia through ordinary commercial channels and the Government withdrew from handling and importing vaccine for sale to private medical practitioners. At the same time the scope of the subsidised schemes for local authorities for the non-African population was extended to include pregnant women and recent immigrants from north-west Europe, who were vaccinated within the first year of their arrival in the Colony. Both African and non-African subsidised schemes were extended to include the giving of a third dose of vaccine.

The Results of Poliomyelitis Vaccination

It was hoped that such a complete vaccination of a susceptible racial and age group would have given some definite answer as to the value or otherwise of poliomyelitis vaccination. Unfortunately no clear cut answer has been given and this must await the future experience of S. Rhodesia to infections with this virus. There was one immediate and successful result in that it demonstrated that a large scale vaccination campaign could be carried out in the face of and during an epidemic of the disease. Vaccination of large numbers of children was being done from the last week of March through to the end of May. It was at this time that the number of notifications of cases in the non-African population fell rapidly, and it cannot be said that this was due to the development of a high degree of immunity resulting from vaccination with two doses of vaccine. It is interesting to note in this connection that there is no record of any of the 2,160 children protected in September and October, 1956, developing the disease in 1957.

The epidemic curve for European notifications in 1957 fits very well with the curve for 1954-55 and it does not seem that vaccination had any effect in speeding the end of the epidemic in the non-African section of the population. It is interesting to note, however, that the epidemic in the African population was very slow in waning, but this may have been due to the fact that there were two epidemic waves for this section, one in the urbanised African population which followed closely the trend of the non-African curve, and the second wave overlapping the first wave and representing the "spill" of infection into the rural areas.

In Queensland, Australia, by 30th June, 1957, practically every child in the state between the ages of six months and fourteen years had been given two inoculations of vaccine, and in all 765,705 doses were given. On past experience the polio incidence in 1957 was expected to be high, but in fact the cases notified January to June, 1957, were much lower than the figures for the corresponding months of 1956, which was not a year of high incidence, namely: 7 (16), 8 (16), 4 (15), 1 (29), 0 (12) and 0 (3). It is hoped that in future years evidence of the value of vaccination will be elicited in S. Rhodesia.

Poliomyelitis After Vaccination

A total of 20 non-African children under 15 years of age developed poliomyelitis after vaccination. Of these, 11 had received only one inoculation of vaccine and no protection could be expected in such cases. Of the nine cases who had had two doses of vaccine, three developed the disease within ten days of the administration of the second dose, and again in these cases it could not have been expected that a high degree of immunity would have been stimulated.

There were six children, therefore, who had been given two doses of vaccine each in the period March to June and who developed poliomyelitis later. The vaccine used in each case was British vaccine. The details of these cases are set out in Table VIII.

In the last quarter of the year there were six cases of poliomyelitis in vaccinated children and three in unvaccinated children. It is not known how many non-African children were not vaccinated, but they must be few in number compared with the vaccinated group.

It must also be said that it is still too early to claim that vaccination has in fact protected the very large number who were inoculated. Only in the future will it be possible to study the value of the protection which has been given by vaccination.

Conclusion and Summary

A study of the poliomyelitis epidemic in S. Rhodesia in 1957 and the extensive vaccination

Table VIII

Poliomyelitis, S. Rhodesia, 1957

Poliomyelitis in Vaccinated Children

Name	*Sex*	*Age in Years*	*Vaccination*		*Month of Onset*	*Paralytic or Non-Paralytic Disease*
			First	*Second*		
1. L.N.	F.	1½	March	April	October	Paralytic
2. W.T.	M.	14	May	June	November	Non-Paralytic
3. N.W.	M.	7	March	April	November	Non-Paralytic
4. A.P.	M.	12	March	April	November	Paralytic
5. R.D.	M.	9	April	May	December	Non-Paralytic
6. M.F.	F.	9	April	May	December	Non-Paralytic

campaign which was pursued allows of the following deductions being made:—

1. Since the 1939-45 War there have been only two periods when the notifications of poliomyelitis indicated an epidemic rise—in 1951-52 and 1954-55. The 1957 epidemic was not unexpected in view of the epidemic conditions in late 1956 in the Union of S. Africa. The onset of epidemic conditions in S. Rhodesia was, however, delayed for two months.

2. The natural history of poliomyelitis in previous years had shown that the African people appeared to suffer from the disease to a minor extent, although there was some evidence that the incidence was increasing. In 1957 the African notification incidence had increased from 1/28 of the non-African rate prior to 1950 to 1/5 of the rate. The number of African cases in 1957 exceeded the non-African total for the first time and more than doubled the figure.

3. Practically all African cases notified are recorded as paralytic, which would point to the existence of many non-paralytic infections which are unrecognised and unreported.

4. The 1957 epidemic curve for non-African cases followed the same pattern as the 1954-55 epidemic; a smooth and precipitous rise and fall with an epidemic peak. The African curve showed the same development trend as the non-African, but instead of falling away rapidly, persisted at a high level for several months long after the non-African epidemic had come to an end. There is some indication that the African urban epidemic followed the non-African epidemic pattern closely, but that the downward trend was prevented by the extension of the epidemic to rural areas.

5. In March, 1957, while the epidemic was still developing, mass vaccination of a susceptible group of non-African children from one to fifteen years of age was carried out, giving each child two inoculations of 1 c.c. each of poliomyelitis vaccine. The vaccination campaign was vigorously pursued in the face of a serious and worsening epidemic situation. This caused no anxieties and there was no evidence that the giving of the inoculations in any way influenced the onset of disease.

6. It seems possible that the wave of the epidemic coincided with a rise in immunity resulting from vaccination, but there is no evidence that the vaccination campaign did affect the course of the epidemic.

7. The extension of the mass vaccination campaign to cover African children aged one to five years who lived in urban conditions and were known to be a susceptible group received poor support, and the number of children who were given reasonably good protection by two doses of vaccine was small.

8. Six cases of poliomyelitis occurred in non-African children who had completed a course of two inoculations of vaccine more than three months before the onset of the disease.

9. A true assessment of the mass vaccination campaign in S. Rhodesia cannot be made on the experience of 1957 and must await the observations made and the experience of the disease in the years to come.

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