

Smallpox and History: the Example of Botswana, 1930-1964

RKK Molefi

Department of History, University of Botswana
email: Molefi@mopipi.ub.bw

Abstract

This study demonstrates that in colonial Botswana outbreaks of mild forms of smallpox were controlled by traditional methods of treatment, much like in the rest of Africa. As a result, Batswana were reluctant to go for vaccinations against a disease the effects of which they claimed they could withstand. Their attitudes towards smallpox however, changed significantly when the malady assumed pandemic levels and killed many of their kith and kin. A hitherto indifferent population now paid particular attention to health propaganda aimed at controlling and hopefully eradicating the disease. Two factors augured well for the eradication of small in the country. The first was cooperation between the local population and medical authorities in the fight against smallpox. The second was the discovery in Britain of a new and effective smallpox vaccine and its subsequent utilization in Botswana in the late 1950s and early 1960s. Finally, the study suggests that valuable lessons may be learnt from this in order to meaningfully deal with the current HIV/Aids pandemic sweeping through Botswana and Africa.

Introduction

I have been informed by several old miners that 'kaffir-pox' (another name for smallpox) is endemic in the old Tati district, and the headman of Mmadinare told me that it was not uncommon in his area, adding that his people did not regard it as seriously as we [Europeans] did.¹

Nearly 40 years after Britain had declared a Protectorate over Botswana. Government officials knew little or nothing about the incidence of smallpox and the attitudes of Batswana towards it. The problem was compounded by Batswana's tendency to delay treating diseases or simply to take them for granted (Mushingeh 1984:254). This paper seeks to add to existing knowledge on the impact of smallpox in colonial Botswana and Africa, and to draw parallels between attitudes towards smallpox then and current attitudes towards HIV/Aids scourge. In both cases, it would appear that Batswana have been generally reluctant to behavioural change until diseases become severe and claim more lives. In the case of smallpox, only then, did health propaganda proclaiming the merits of vaccination against smallpox make much sense to Batswana, thereby yielding the necessary cooperation to enable the final eradication of the disease in the country by 1964. Important lessons on HIV/Aids may thus be learnt from these historical questions and comparison with past pandemics (Molefi 2001:259-267).

The Spread of Smallpox in Colonial Southern Africa

In a path breaking study, 'Smallpox Inoculation in Africa', Eugenia W. Herbert has shown that variolization was a widespread practice in pre-colonial times (Herbert 1975:539-559). Assuming that such medical knowledge was carried into colonial Africa, Hartwig and Patterson wonder whether the practice made colonial vaccination campaigns any more, or less acceptable (Hartwig and Patterson 1978). In Botswana, smallpox first attracted official attention in the 1930s when the disease was endemic and generally people used traditional methods of treatment and only reluctantly

accepted vaccinations. Between 1943 and 1964 however, the disease assumed pandemic proportions, killing more people than ever before and Batswana enthusiastically accepted vaccinations against the scourge.

In Southern Africa, smallpox was known by several pseudonyms such as Amaas, kaffir-pox, buffalo, imfoloko, ingexbongo and mezi (Nyembesi *at el* 1969). The disease was prevalent in the Transvaal, apparently brought there by African immigrants travelling from Tanzania, Malawi, Zambia, Zimbabwe and Mozambique.² In eastern Zimbabwe the disease had been prevalent in Chibi, Gwanda, Insiza and Umsingwane districts, from where it posed a serious threat on Botswana from the early 1930s. To most African male labour, the pressure to find wage employment appears to have exceeded the danger of contracting smallpox. As one source puts it: 'The natives do not fear smallpox as death rates from the disease is negligible.'³

The spread of smallpox in the Transvaal, eastern Botswana and Zimbabwe was associated with the movement of healthy and unhealthy African labour following the end of the Great Depression of the early 1930s. Available evidence suggests that medical authorities, the police and employers of labour could not effectively control the influx of African job-seekers in the Transvaal. Of this desperate situation, *The Star* reported:

Natives engaged by the WNLA at Phafuri are medically examined and vaccinated at Zoekmakaar; those engaged by the Messina (TVL) Development Company, Zebedila Estates and Bethal Farmers Association are examined and vaccinated at Messina the remainder passes through the northern Transvaal without medical examination.⁴

As smallpox did not claim many lives in the Transvaal, authorities in South Africa did not resort to repatriation of illegal immigrants. Instead, there was a call for the establishment of camps at Phafuri and Beithbridge, where prohibited immigrants could be examined, vaccinated and then forwarded to places of employment.⁵ Meanwhile, many immigrants continued to dodge the police 'by travelling at night'.⁶ Interestingly, those who had no vaccination certificates and passes which cost 5/- each at the African Affairs Office at Messina risked being arrested by the police. Whenever caught by the police, immigrants were imprisoned for five days and upon release, they were given passes with the exception of those under the age of 18.⁷

Frequent labour migrations of thousands of job seekers from Zimbabwe, Botswana and other countries to the Transvaal provided optimal conditions for the spread of diseases, notably smallpox. Cases of smallpox were also found among resident populations from 1930 onwards. In May 1930, an outbreak of smallpox was reported from villages near Livingstone and the area was placed under quarantine.⁸ Another outbreak was reported in the Linyati district in October 1937. Hardly a month later, field officers confirmed a case of variola in the Beithbridge area.⁹ Following these reports, health authorities in Botswana assured their counterparts in Zimbabwe that they were 'ready to cooperate as far as possible'.¹⁰

In response, Zimbabwean health authorities assured their counterparts in Botswana that the situation was under control. In December 1937, vaccination against smallpox was reported to be nearing completion in the Chibi, Gwanda, Insiza and Umsingwane districts.¹¹ Of the 107 cases recorded in Zimbabwe in 1937, there were only 2 deaths. 100 cases were reported in Beithbridge, 5 at Gwanda and 2 at a mission station about 70 kilometres southwest of Belingwe.¹² An extensive vaccination campaign was launched in November 1937 from a line running north of Plumtree, Bulawayo, Gweru, Fort Victoria to Mutare. Another campaign covered an area of about 90 to 110 kilometres round Beithbridge.¹³ In addition to their efforts, officials hoped that 'mother nature' would halt the spread of smallpox between the two

neighbouring countries. Of this, an optimistic medical officer in Bulawayo informed Botswana's Principal Medical Officer in December 1937 that: 'A big block of country extending from Beithbridge to Bulawayo should form a protective barrier between the few cases in the Fort Victoria district: and your territory.'¹⁴

Authorities in Botswana took no chances. Having supplied enough calf lymph vaccine to Francistown, they requested that vaccinations should begin almost immediately among people working at the mines in the Tati district, as well as those living along the border with Zimbabwe. Between 7 and 12 December 1937, the Francistown medical officer had vaccinated a total of 530 people. Of this number, 336 were African mineworkers, 147 were African females and children. 27 were European employees of the mines and 20 were residents of Francistown.¹⁵ Unfortunately, we do not have the statistics on the population of this town at the moment. Further vaccinations were however disrupted by adverse weather conditions as Shashe, Tati and Ramokgwebana Rivers were in flood with several stretches of black turf and almost impassible.¹⁶

As if that was not enough, 2 cases of smallpox were reported, one in the Shashe area around old Tati and another South of the Shashe river in the Mmadinare-Bobonong area. In spite of poor weather conditions the medical team did its best. They vaccinated all possible contacts, and through Chief Tshekedi Khama and the District Commissioner, asked people living in the Mmadinare -Bobonong area to have as little contact as possible with people across the Shashe River in the Francistown area.¹⁷ Furthermore, railway ticket examiners and guards were asked not to issue tickets to Africans with obvious rash onto trains travelling between Francistown and Serule.¹⁸ Nonetheless, such warnings were likely to be ignored because as the headman of Mmadinare, Phetlhu Mphoeng told Dr. Bernard Thomas Squires, 'his people did not regard smallpox as seriously as Europeans did'.¹⁹

Not all Europeans took smallpox seriously. Opposition to vaccination however, was sporadic and far between. From Map mine around Francistown a white manager objected to the vaccination of his employees on the grounds that, as he was experiencing shortage of African labour, 'vaccination would further embarrass his already difficult position'.²⁰ From Bloemhof in the Transvaal-South Africa, Tshekedi Khama received a letter from an angry unknown writer who queried the claims of pro-vaccinators, arguing that: 'The danger from vaccination is far greater than smallpox itself. Immunisation by injection,' he charged, 'is unnatural; in fact Pasteur's germ theory is erroneous and unsubstantiated.' He regretted that: 'the natives are far more affected than whites; yet in the mining areas vaccination is one of the conditions of employment.'²¹

According to this Transvaaler, 'cases had been reported of native women evading health officers though infected, while the child at breast is unaffected.' In case Tshekedi Khama was in doubt, the writer referred him to the Secretary, National Anti-vaccination league in London.²² Tshekedi Khama dismissed these claims and passed the letter onto health officials at Mafeking for their own information.

Meanwhile the threat of smallpox from the Transvaal into Botswana continued. Between December 1937 and February 1938, Kgatleng's riverine villages near the border with South Africa received heavy rains as well as Sikwane's first two cases of smallpox. The disease was directly traceable to long-distance labour immigrants who criss-crossed the area between Kgatleng and the Transvaal. 'Bakgatla continually moving to and from the union,' wrote Mochudi's acting District Commissioner, 'increase the danger of spread of smallpox.'²³ Although roads in the river villages were impassable owing to the heavy downpours, one Dr. Burgher of the Dutch Reformed Church mission hospital at Mochudi 'offered to vaccinate the people in this Reserve if only he could be supplied with the vaccine.'²⁴ Authorities at

Mafeking supported the idea and suggested that vaccination should be extended to other equally vulnerable areas such as eastern Gammangwato. In a letter to the Government Secretary, the Principal Medical Officer, pointed out that: 'If vaccination is to be done in the Bakgatla Reserve it must be done in the Bamangwato Reserve, especially the eastern border where there is as much coming and going as there is in the Bakgatla Reserve ...'²⁵

For his part, the Government Secretary, G.E. Nettelton realized that the Administration had no capacity to deal with a major outbreak of smallpox, especially in Botswana's densely populated villages. More than ever before, officials were convinced that prevention would be better than cure. The failure of neighbouring South Africa in dealing with the prevalence of smallpox in the Transvaal was instructive. Explaining the need for a countrywide vaccination campaign to all District Commissioners in the country, the Government Secretary observed: 'Any outbreak occurring amongst any large concentration of people, such as in the villages of Serowe, Kanye, Mochudi, etc, would be difficult to control and might have the gravest result'.²⁶

Botswana knew from sad experience that a number of recent epidemics and pandemics had been uncontrollable and had killed many, of their kith and kin. Consultations with chiefs, headmen and their *merafhe* therefore, yielded unequivocal support for the vaccination campaigns. Meanwhile Government medical doctors and their counterparts from mission hospitals were asked to train teachers and other African lay-vaccinators for the massive task ahead. While teachers were expected to deal with the already organized school population of the country', other lay-vaccinators would attend the general public, especially in the outlying villages and cattleposts.²⁷

As there was no power under the Public Health Regulations to compel persons to be vaccinated, the Resident Commissioner, Charles Nicholas Arden-Clarke requested the High Commissioner to make such a provision. In response, he issued High Commissioner's notice No. 116 of 1938 that made vaccination compulsory in any specified area, if necessary.²⁸

Respective District Commissioners were asked to liaise with chiefs and headmen to select suitable centres at which people could congregate for the purpose of vaccination. The dates for 'vaccination were set and the campaign was scheduled to run from the months of June to August 1938'.²⁹ During this campaign, medical authorities agreed that calf lymph vaccine was the correct dose to use for the vaccination. In 1943, however, the dose was reduced to lcc. The argument was that lcc had been in use in the army in South Africa and was found to be efficient and much more economical.³⁰ As a way of cutting costs of the general countrywide vaccination campaign, teachers were dropped from participating in the exercise.

Instead, Government had an interesting experiment of African lay-vaccinators. Staff shortages forced the Administration to resort to the use of lay-vaccinators and the experiment was more successful than many had expected. Each one of the major villages of Kanye, Mahalapye, Mochudi, Molepolole and Serowe etc. had four African lay-vaccinators while Lobatse had four Sanitary Inspectors. The main centre of Kanye had its own sub-centres of Moshupa, Manyana, Ranaka, Kika, Macheng, Lekgolobotlo, Digawana, Kgoro, Kokong, Khakhea, Maokane, Kuke and Sekoma. Cattleposts near or around these places were covered though not necessarily listed. Under Molepolole were the sub-centres of Thamaga, Mankgodi, Gabane, Mogoditshane, Kopong, Lentsweletau, Lethakeng and Lephephe, while Good-Hope, Thhareseleele, Ramatlabama, Dithlapeng., Phitshane-Molopo and Tshidilamolomo fell under Lobatse Administrative district. Reports reaching the office of the Principal Medical Officer at Mafeking from the various main centres commended the work of

the African lay-vaccinators. From Molepolole, Dr. Peter M Sheperd was pleased with the way they were doing their work. Similarly, the District Commissioner remarked on the thoroughness of the lay-vaccinators' work.³¹ From Lobatse, the four Sanitary Inspectors reportedly undertook an efficient and successful campaign and quite willingly men, women and children submitted themselves to vaccination without question.³² Vivien Ellenberger in Serowe observed that the 'four lads were somewhat superior beings - good at their work.'³³ He asked the Principal Medical Officer to give them lorry transport, 'instead of buying donkeys for them.' Mahalapye and Mochudi reported good attendance and satisfactory results with attendance from the neighbouring cattleposts extremely encouraging.³⁴ For a vote of thanks to the African vaccinators, we return to the compliments of the man who led the pack, the perceptive Dr. Peter M. Sheperd, who wrote on 1st August, 1938: 'vaccinators did excellent work - not one case was reported of acute cellulites of arm or an untoward result from vaccination.'³⁵

Although the pay was good, vaccination was a difficult and sometimes hazardous job. For wages African vaccinators took home £3 per month plus a commuted bicycle allowance of 3/- per month.³⁶ In those days, a bicycle was a prestigious means of transportation among young men, much more so than a donkey. The latter, often called the beast of burden, is a clumsy animal to control especially when it is tired. Normally, vaccinators had to travel long distances to and between remote villages, schools and cattleposts carrying out the vaccinations and issuing certificates. Vaccination certificates had to be issued to every man, woman and child vaccinated unless as the Kanye Acting District Commissioner put it 'the work is to be impeded.'³⁷

Vaccinators were told about the importance of issuing certificates to all those who were seeking passes, to mine recruits and any other person who desired to travel.³⁸ From Mafeking, the Principal Medical Officer was insistent on this and for good reasons too. African males wishing to get to the mines for the first time were held back until they had been vaccinated at least three times with negative results.³⁹ Thus epidemics such as smallpox had a negative impact on African labour supplies to the Union mines, farms and factories. For this reason, certain mining houses often offered assistance in the control of diseases. Not surprisingly, to them a healthy labour force meant higher productivity in the workplace. To them, health was wealth and epidemics were regrettable. In June 1938, for example, 'The Rand Mines regretted the outbreak of smallpox in Maun and ordered that all recruits be vaccinated before coming out.'⁴⁰

Another problem for the vaccinators and for the Administration was the supply, preservation and transportation of vaccines, especially in the remote or distant centres of the country. Commenting on vaccine preservation in these areas, one official reminded the Government Secretary: 'The tubes of lymph would require to be sent to Maun in vacuum flasks to ensure against high temperature and consequent deterioration while it was being sent to the more distant centre'.⁴¹

Nonetheless, the vaccine had deteriorated somewhat upon reaching the more distant centres. Apparently, the methods of delivery were undependable. Supplies were sent up by occasional lorries to places like Gumare and Ikoga and taken on from there by a runner if necessary.⁴² As most roads were bad, it must have taken long for a lorry to reach these places, to say nothing about a runner. Under these circumstances, the vaccine must have lost some of its potency, hence one could expect: 'a certain amount of reluctance on the part of the people to be vaccinated, especially when it was known that the vaccination may cause sore arms.'⁴³ By contrast, in the Nata area serviced by the Travelling Dispensary (north) too many 'Basarwa were reported to be coming from the distant cattleposts to those in the neighbourhood of the river,' and

willingly presenting themselves for vaccinations. Their number was estimated to be around 800 and Dr. B. T. Squires requested employment of African vaccinators for this number.⁴⁴

The availability of water in the Nata River at the beginning of the dry season around mid July in 1938 attracted both the Basarwa and the elephant population into the area. Basarwa 'wanted to water cattle while elephants needed water for their own consumption. As the Basarwa were familiar with the Travelling Dispensary and with Dr. B. T. Squire himself, they readily submitted themselves to vaccinations against smallpox. However, to the elephants, the Travelling Dispensary was a nuisance whose movement they disrupted by 'blocking the only road along the river by pulling trees' etc. on it. It was now over a year that elephants had made it impossible to get the dispensary van far along the road, which was only just wide enough at the best of times.⁴⁵ Determined to complete his tour of duty at Nata. Dr. B. T. Squires disregarded the danger posed by the large animals. He sought permission from his supervisors to use his car on that trip as it could 'make a detour under the branches where the dispensary van could not go.'⁴⁶

Such determination and courage was instrumental in the completion (though not necessarily success) of the territorial vaccination campaign conducted between June and September 1938. Addressing the African Advisory Council on the just ended campaign during its 20th session of 6-10th March 1939, the Resident Commissioner, Charles Nicholas Arden-Clarke explained: 'Owing to the prevalence of smallpox in the Transvaal and the impossibility of controlling traffic along the extensive eastern border of the territory it was considered advisable, as a safety measure, to institute a vaccination campaign'.⁴⁷

Altogether, a population of approximately 135000 men, women and children were vaccinated at an average cost of 3d per head.⁴⁸ Yet it was one thing to vaccinate people against smallpox and quite another to establish effective immunity. Immunity could not be guaranteed because tropical conditions had an adverse effect on the potency of the calf lymph vaccine, especially in remote rural areas. Several implications emerge from such a scenario. First, it meant that only a small percentage of the population could be vaccinated. Second, without a much more effective and consistently potent vaccine, recurrences and relapses could be expected to have been common in Botswana. Third, people must have continued practicing their traditional method of smallpox prevention, i.e., the inoculation of the healthy from a pustule of a person with the disease. Under normal circumstances, this procedure prompted a mild infection and finally immunity against smallpox.⁴⁹

Border villages, police camps and neighbouring cattleposts as well as labour compounds were particularly vulnerable to infection due to increased intercommunication in and around and through them. In November 1938, for example, Ramokgwebana border gate reported one case of smallpox and well over 200 unvaccinated persons in the neighbouring villages and cattleposts.⁵⁰ With constant migrations between Botswana and Zimbabwe, it was extremely difficult to control smallpox. Habangaan, Moroka and neighbouring villages desired vaccination in November 1938, but the road to these places was 'very bad and quite impassable for heavy vehicles when wet.'⁵¹ By contrast, labour compounds near administrative centres stood a better chance for prompt medical attention because ill-health in them would adversely affect economic activity. Following an outbreak of smallpox at monarch mine compound, Dr. B. T. Squires promptly vaccinated 870 persons, mostly women and children,⁵² in September 1942. Likewise, Dr. Dorik K Ludwin vaccinated about 50 men, women and children at the Public Works Department (PWD) camp against smallpox on 30th September 1941 in Gaborone.⁵³

Smallpox During World War II

Increased intercommunication during the Second World War aggravated the spread of smallpox in Southern Africa generally, and in Botswana in particular. The introduction of new strains of smallpox into Cape Town from India in 1941 and its spread to neighbouring areas, including the Orange Free State and the Transvaal, point to the significance of increased contact. Three main groups of smallpox strains have been identified; viz; Group A, which occurs in Europe and Asia, with the most virulent strain in Bangladesh; Group B, occurring in Africa and moderately virulent, but also very diverse; and finally Group C, which is associated with Latin America, and is very mild (Dumbell and Farida 1975).

Although vaccinations were undertaken on nearly all the inhabitants of the city of Cape Town and 'neighbouring areas, the continued influx of possible carriers of the disease in the region went on unabatedly. Under these circumstances, re-infection was likely to occur. Around October 1943, a man returning to Kgatleng from Rustenburg in South Africa introduced Kgatleng's next case of smallpox epidemic. By 3rd November 1943, the case was in hospital at Mochudi and was reported to have slept for a night at Sikwane.⁵⁴ The railway stationmaster reported another case of smallpox at Pilane, but the man disappeared without trace,⁵⁵ much to the anxiety of health authorities.

Several precautionary measures were subsequently undertaken in Kgatleng. 14 days quarantine was imposed on Sikwane and all villagers were to be vaccinated. The post of entry at Sikwane was closed to motor passenger traffic, and all outgoing traffic was ordered to cease for the quarantine period. Once the quarantine had been lifted, all incoming European and African travellers were to be vaccinated at the police post before being allowed to enter Kgatleng. The District Commissioner for Mochudi was asked to appoint 2 lay-vaccinators at the rate of 2 ½ per diem, to undertake vaccination in the whole of Kgatleng under the supervision of the Health Inspector.⁵⁶ On a visit to Mochudi, the Acting Principal Medical Officer left 500 doses of calf lymph vaccine with one Dr. Le Roux, and promised that he had ordered a further 2000 doses.⁵⁷

The vaccination campaign of November 1943 in Kgatleng was in many ways different from that of June to September 1938. The latter exercise was undertaken before the ploughing season, when people were in their major villages and willingly presented themselves for vaccination. Quite the opposite happened in 1943, when the rains were exceptionally good, early enough, and raised hopes for a bumper harvest in line with the Department of Agriculture's wartime call for increased food production. Moreover, the chief's representative had given his blessings for Letsema, as part of the drive for increased wartime food production. Thus, Bakgatla like other merafe elsewhere in the country had to go to their fields to plough.

As might be expected, these seasonal agro-activities did not augur well for vaccination campaigns. To this end, Mochudi's District Commissioner lamented that 'Heavy rains hindered the successful operation of the vaccination campaign and rendered the roads impassable and the rivers uncrossable'.⁵⁸ As the floods could be expected to subside within a reasonable period, his major problem was 'the streaming of people to their lands to commence cultivation'. People will not, he told the Principal Medical Officer at Mafeking, 'be deflected from this purpose, attendance at vaccination centres is regarded by them as a matter of secondary importance'.⁵⁹ Health workers had no choice but to follow them to their lands, all over Kgatleng.

Saul Krugman, Robert Ward and Samuel Katz suggest that smallpox frequently induced abortion among pregnant women (Krugman, Ward and Katz 1977:313). Ignoring the impact of the disease on women and children, others have

suggested that smallpox simply accompanied people and where medical services were available it was easier to check its spread.⁶⁰ One suspects that as the disease deformed human faces, it must have caused blindness among people of all ages and sexes. For the most part, authorities and employers of labours were concerned with the health of men in relation to economic activities. From time to time, employers of African labour regretted outbreaks of smallpox and ordered that all recruits should be vaccinated before leaving their homes. In November 1943, for example, all new mine recruits from Kgatleng were held back until they had been vaccinated successfully, i.e. three times with negative results.⁶¹

Meanwhile, European thinking about the Africans' public health was changing for the better. In October 1943 the High Commissioner, Sir Evelyn Baring conferred with Tswana chiefs and for the first time stressed the need for training more Africans for the health and medical services. Urging the Administration and the chiefs to do something about the poor state of public health in the country, he said: '...the preventive side of public health could not possibly progress with a staff of 1 Health Inspector and 4 Pupil Health Inspectors in a territory with an area of 265 000 square miles. More staff is required urgently'.⁶²

Nonetheless, throughout the war period, the number of health staff, doctors and hospitals remained the same in the face of an increased burden of disease. Given this inadequacy, the Administration was dependent on medical doctors of the various government and mission hospitals as well as African lay vaccinators. Many of these had acquired experience of vaccination for smallpox from the last campaign of June to September 1938. An unexpected extension of the campaign in Nata and Ghanzi had also served them well.⁶³ Attempts to co-opt teachers to join their ranks as part of their duties, however failed. Government wished to use teachers as lay vaccinators as a way of reducing the costs of the campaign. In the meantime, Botswana's one and only Health Inspector, D. Ingram continued to cover huge tracks of a difficult terrained country, conducting vaccinations and supervising African vaccinators. Meanwhile, for one month, the Railways Health Assistant did all the vaccinations on railway employees and their families.⁶⁴

Between October and November 1943, an unusual number of cases of smallpox at Mogorosi village near Kalamare and Shoshong prompted quarantine measures at this settlement. Headman Ramarogong of Mogorosi village was asked to prohibit all movements of people to and from Mogorosi and the neighbouring lands of Letetengwe about 10 kilometres south-east of Mogorosi.⁶⁵ Altogether, a total of 5 cases of smallpox had been reported at this village. Apparently, all cases recovered without treatment, but one was subsequently hospitalized for disease of the eye, whereupon he developed smallpox together with another contact at the Sekgoma Memorial Hospital in Serowe. Under these circumstances, the medical officer in-charge had to vaccinate all hospital patients, staff, the Serowe European population and the general public as soon as he possibly could.⁶⁶

Compared to the campaign of 1938, Gammangwato's second major vaccination exercise was more elaborate and better organized, proving that a lot had been learnt from past experience. The campaign was manned by Serowe's medical officer, the health inspector, two of the country's Pupil health inspectors, and three African lay vaccinators used in the previous undertaking. Having just returned from the Kgalagadi district, the health inspector was assigned to the outlying areas of Lethakeng, Mopipi, Rakops, Makalamabedi, etc., while Serowe and Palapye were done by the medical officer of Sekgoma Memorial Hospital. Kalamare, Shoshong and Mahalapye were covered by the medical officer for Mahalapye. From Sefhare Mission Hospital, Dr Winifred N. Tribe was put in charge of the campaign covering the villages of Sefhare, Machaneng, Lerala, Ratholo, Goo-Tau and Makwate villages and

cattleposts. The mission doctor was provided with vaccine, lay vaccinators and motor mileage at government expense. Like before, he agreed to do the work but requested that Maunatlala village be covered by the medical officer doing Palapye and surrounding areas. As the road to and from Goo- Tau was bad, Dr. Winifred N. Tribe suggested that the residents there be persuaded to travel to Ratholo for their vaccinations.⁶⁷

Meanwhile, the office of the Principal Medical Officer at Mafeking wanted to reduce the cost of drugs for the campaign. Having found that in the last campaign 50 dose tubes of lymph produced about 30 doses in the hands of lay vaccinators, medical officers were asked to average two persons to one tube as that would reduce the Administration's costs by half.⁶⁸ Experience from Britain was transplanted onto Botswana with the Acting Principal medical officer explaining: 'As you know, the present method in use in the British Army is one drop of lymph with one superficial incision $\frac{1}{4}$ long. The vaccination is adequate and means a considerable saving in time and material'.⁶⁹

The prescription proved appropriate and timely for a cash-strapped administration with a heavy burden of disease and skeletal medical staff covering a vast country. The vastness of the country often presented numerous problems in the delivery of vaccine, a situation that prompted a rescheduling of the vaccination campaign. In January 1944, for instance, Dr. Winifred W. Tribe of the Sefhare Mission Hospital had to vaccinate school children again when schools reopened because many had already left for the lands when he received his supplies of lymph.⁷⁰ By contrast, in Kgatleng the Health Inspector faced a different problem altogether. In addition to fighting the problem of smallpox in 1943, bilharzias was endemic while syphilis and tuberculosis were reputed to be very prevalent throughout the district.⁷¹ A year later, heavy rains and impassable roads impacted negatively on a vaccination campaign by the same Health Inspector in Rakops, Makalamabedi, Mopipi and Lethakane.⁷² These problems not only caused a delay in his work but also affected the quality of vaccine at his disposal.

Although smallpox had a low mortality in Botswana, the disease continued to be a serious public health problem for a long time. In areas such as Ngamiland, smallpox competed with other diseases for victims. In Ngamiland, W. H. Cairns, the Acting District Commissioner reported isolated cases, of smallpox, rabies and sleeping sickness. Sleeping sickness along with malaria and bubonic plague was classified among prevalent diseases that required: 'a more active policy in preventive medicine in Ngamiland but any such undertaking', he reckoned, 'was limited by the difficulty in obtaining qualified men to carry on the work'.⁷³ As a result, the Administration solicited the assistance of volunteer vaccinators. In the Chobe District, for example, R. R. Booth of the Witwatersrand Native Labour Association (WNLA) provided remarkable public health service. He reported a large number of people who suffered from syphilis and was ready to help treat them once he was provided with NAB and Bismuth. Still, Booth obtained satisfactory results in the vaccination campaign of November 1944, having done a total of 2225 men, women and children.⁷⁴

Like Chobe with its Kazungula ferry, Francistown with its railway network had a problem of transient labour to and from neighbouring countries, an influx that helped the regional spread of diseases. At Francistown, for example, the resident Medical Officer vaccinated 9152 recruits of whom 2130 were Angolans en route to Salisbury.⁷⁵ Meanwhile unvaccinated European farmers, in neighbouring Tuli Block feared the possible spread of smallpox from the Transvaal in South Africa. Unable to meet their seemingly unreasonable demands, the Deputy Director of Medical Services castigated the farmers, saying they were free in 'proceeding to Swartwater in South

Africa to obtain vaccination from the District Surgeon there, provided, of course, that they pay their own expenses'.⁷⁶

Undoubtedly, the Administration's human and financial resources had been and continued to be stretched to the limits during wartime. The medical department was now dealing with outbreaks of diseases as they arose without much research on either their patterns or impact on the general population. By July 1944, 125 cases of smallpox had been reported at Macheng and another 17 cases confirmed at Digawana villages in Gangwaketse. A few years later, the World Health Organisation declared that an average of between 30 and 40 cases a month constituted an epidemic in a given country.⁷⁷ This particular outbreak was traced to the Slurry Cement Works in South Africa, where some Batswana men earned a living. The majority of these men usually rode their bicycles back to their homes on Fridays, returning to Slurry on Sunday afternoons. Frequent movements such as these tended to help the spread of diseases like smallpox. In a desperate attempt to halt the spread of the disease, the Administration asked the headmen of Macheng, Mokgomane and Magoriapitse' to stop all movement of people away from their villages until further notice'.⁷⁸

Following outbreaks of smallpox in Lobatse and Gangwaketse in July 1944, the Administration appointed Lobatse's medical officer, Dr. T. Dunston to take charge of the vaccination centres working in close consultation with local dikgosi, dikgosana and doctors in Lobatse, Borolong, Gangwaketse and Gaborone. While officials were concerned about conducting successful vaccination campaigns, ordinary people were bothered by food shortages and the scarcity of wage earning opportunities in the country. An unusual development during this campaign was the sudden appearance of 19 mentally ill former soldiers discharged from the African Auxiliary Pioneer Corps (AAPC), comprising 17 Africans and 2 Europeans. The men had to be vaccinated and maintained by the state after being released from the Union's mental hospitals.⁷⁹

Figures on mortality during this epidemic are unreliable. The chiefs and the people were unwilling to give authorities all information on deaths. For their part, Europeans were aware of only a certain number in catchment areas. Doubtless many cases and deaths went unreported in what appears to have been the country's worst epidemic of smallpox in several years. Between September and December 1944 authorities in Mafeking received the following information on Botswana's just ended vaccination campaigns. As shown in Table 1, Lobatse and Gangwaketse had the highest number of cases of the epidemic and 6 reported deaths. Four of the 237 cases of smallpox were Europeans at Ditlharapeng,⁸⁰ which for purposes of this campaign, fell under Lobatse. By contrast, in table 2 we are not given any figures relating either to cases or to deaths. Obtaining mortality figures was probably impossible, for people were buried in their natal villages and remained unregistered. (Brown 1978).

TABLE 1
Returns of Vaccination Campaign -1944

PLACE	(ALLSEXES) NOS. VACCINATED	CASES	DEATH
Mochudi	6 093	-	-
Ngwato Area	13 766	-	-
Lobatse-Kanye	16 497	237	6
Francistown	3 570	-	-
Kgalagadi	1 030	2	-
Grand Total	40 956	239	6

TABLE 2

Place	No. Vaccinated (Males)	No. Vaccinated (Females)	Total
Molepolole	1 778	3912	5690
Thamaga	298	713	1029
Letlhakeng	530	594	1124
Lephephe	55	171	226
Lentseletau	130	166	296
Kopong	55	116	171
Grand Total	2846	5690	8536

Source: S.102/3, Shepherd to DDMS.27.12.1944

Smallpox And Public Health -The Postwar Era

Having lagged behind for many years, the preventive side of public health was in 1945 catapulted by the appointment of Dr. John W. Pickles as Botswana's first medical Officer of Health (MOH). The appointment was part of the post-war reconstruction programme and Pickles set his mind to work right away. He identified four major factors that militated against the development of an active policy in preventive medicine. Among these were, the vastness of the country, its scattered population, poor communications and the people's indifference towards smallpox, which led to their reluctance to get vaccinations as well as failure to report cases with due promptitude. Pickles however, did not bite the hand that fed him. He did not blame the Administration for putting emphasis on the curative rather than the preventive side of public health.

To Dr. John W. Pickles, *dikgosi* and *dikgosana* (chiefs and headmen) and their people and not the government, constituted the appropriate vehicle for taking forward the vaccination campaigns against smallpox in Botswana. With the support of the Director of Medical Services, the Resident Commissioner and the Government Secretary, Pickles planned to and indeed gave propaganda talk on smallpox and the significance of vaccination backed by use of mobile films. Addressing the 28th session of the African Advisory Council of the 11th to 20th August 1947, Dr. John W. Pickles began: 'From time to time campaigns have been undertaken among the people of the Protectorate with the object of vaccinating them against smallpox but the response has always been disappointingly small.'⁸¹ He thus expressed the hope that members of the council 'will use all their influence to persuade the majority of their people to take advantage of the facilities afforded'.⁸²

In Botswana and in Zambia, the policy of the governments had been to protect the population by regular vaccination and to deal with outbreak of smallpox as they arose by the usual means of isolation, vaccination and quarantine measures. Dr. John W. Pickles was convinced that the policy had inherent weaknesses. He observed that while the High Commissioner's Notice No. 116 of 1938 made vaccination compulsory for all people, 'it was not an easy legal instrument to enforce except with the full co-operation of chiefs and headmen.'⁸³ Talking about the people directly affected by smallpox, the Medical Officer of Health informed the council that: 'People do not know that if they are properly or successfully vaccinated then it is not easy for them to take smallpox, and that if they do, it will not be the severe type while those not vaccinated may become very ill and die'.⁸⁴ By way of demonstration, John W. Pickles took the Council on a conducted mental tour of Great Britain where in the 1870s millions suffered from a virulent outbreak of smallpox and thousands perished.⁸⁵

The message was loud and clear. While chiefs and headmen had the responsibility to teach their people through *dikgotla* assemblages, parents had the equally important obligation to vaccinate their young. Turning to the vulnerability of infants and youths, Pickles told the males only Council that: 'Babies and young children will take smallpox more easily and will die more easily than adults, therefore it is the duty of all parents to have their children vaccinated before they are six months old.'⁸⁶

Hardly a year later, doctors recognized two strains of virulence entering the country from South Africa and Zimbabwe with 'the mortality rate in some areas being very high.'⁸⁷ After three months, 32 cases of a severe scourge of smallpox were reported at Manyana village in Gangwaketse with 10 deaths. The first case was reported in Molepolole and another one at Molethi near Phitshane-Molopo in the Barolong Farms. In December 1948 the Director of Medical Services happily told the Government Secretary that 'response to vaccinations in all areas has been excellent.'⁸⁸ At Mputsane ward in Kanye, two children died of smallpox in one family following a trip to Digawana village by one of the relatives. As Chief Bathoen II put it: 'someone visited the latter village, came back and gave the disease to the family'.⁸⁹ Bangwaketse and their chief doubted the effectiveness of the quarantine measures imposed on the residents of Mpuutsane ward. Following a *kgotla* meeting held in April 1949, Bangwaketse opted for 'a general vaccination campaign in Kanye and district as the disease was spreading and was causing death'.⁹⁰

Equally affected by a virulent form of smallpox were the villages of Molepolole and Mogoditshane in Kweneng, Shoshong and Kalamare in Gammangwato. Shoshong had 31 cases with 6 deaths while Mogoditshane reported 18 cases with 8 deaths. Molepolole had 'quite a number of cases, most of whom had either not been vaccinated or were vaccinated unsuccessfully'. At Thamaga, the position did not seem to be quite as bad as in Molepolole, but Dr. Alfred Musgrave Merriweather suggested another intensive vaccination campaign in Molepolole and Thamaga.⁹¹ He was willing to supervise the campaign but would certainly value the help of Government personnel, particularly Health Inspectors.⁹² Compared with previous campaigns, attendance at Molepolole, Shoshong and Kalamare was very good. Authorities attributed this to the interest shown by officials and European storekeepers at the different villages.⁹³

Unbeknown to Batswana, health authorities had for sometime anticipated such severe outbreaks in view of the widespread incidence of smallpox in neighbouring countries,⁹⁴ and in Africa generally. Following the outbreaks people were now presenting themselves for vaccinations and more than ever before, they promptly reported cases of the disease to health officials. In Maun for instance, *dikgosi* supported the campaigns and their people were willingly being vaccinated at the *kgotla* daily.⁹⁵ At Pilane station in Kgatleng, 7 cases of smallpox were reported and upon visiting the settlement, Dr. G. H. J. Teichler of the DRC Mission Hospital found that the 'Damara had put the patients into one hut together.' In spite of the congestion created by this form of isolation, he observed that the 'people were reasonable.' He vaccinated all contacts and 30 other people at Pilane station before informing the District Commissioner that 'there was no cause for alarm as the situation was under control'.⁹⁶

With the unsettled political situation in Serowe following Seretse Khama's marriage to Ruth Williams in 1948 (Parsons, Tlou and Henderson 1995), attention shifted to the railway village of Mahalapye. Sources indicate that 'a mass vaccination campaign in the Ngwato Reserve was suggested to the then District Commissioner'. Anticipating trouble at Serowe however, he felt 'that in view of the unsettled political situation in the Reserve at the time, it should advisably be postponed to a later and

more opportune occasion.⁹⁷ Thus warned, the Director of Medical Services directed his attention to the proper vaccination of mine recruits destined to the Rand mines. Of this, he informed the Government Secretary that: 'All mine labour at Mahalapye is being detained for a period of 14 days for attestation and vaccination before being allowed to proceed to the Rand.'⁹⁸ As the travelling public also helped the spread of smallpox, public transport to and from Mahalapye was stopped in the hope that: 'These steps will succeed in limiting the outbreak though it is of course not known to what extent human communications between this area and other centres had already taken place'.⁹⁹

By contrast, the Kgalagadi district had neither the personnel nor health facilities necessary for the control of smallpox. Moreover, here, drought conditions tended to exacerbate the spread of the contagion among people who normally clustered at watering points. Not surprisingly, people at Kang still vaccinated themselves with zest from the cessations of infected persons. 'Finding their response to vaccinations unbecoming, an itinerant Medical Officer, Dr. A. D. F. T. Moikangoa described them as 'a sluggish and obstinate people who are each a law unto themselves (sic).'¹⁰⁰ From Kang he stopped at Tshane, where he reported that: 'a visitor from Sodom Kang had infected his hosts and those who attended his burial.'¹⁰¹ On a stopover at Tsetseng in Kweneng west, Dr. ADFT Moikangoa found that 'the scourge was severe and had claimed the lives of 60 people in two months.'¹⁰² Giving detailed report on the disease, observed that:

[The] onset was characterized by severe diarrhoea with blood and mucus for 2 days. Rash appeared on the third day with high fever and prostration. Death occurred within 7 days from asphyxia, apparently due to acute tonsillar enlargement or else the patient survived to recover after 3- 4 weeks of illness.¹⁰³

While health authorities oiled their propaganda machinery, ordinary people prepared themselves for subsequent vaccinations and attendance was exceptionally good. Officials seized the opportunity to commend those who had vaccination marks and had not contracted the infection, and reprimanded 'the evil hearts who were pocked and had no vaccination marks...'¹⁰⁴ The latter were accused of perpetuating the traditional method of treatment of smallpox whereby healthy people were vaccinated, very often on the forehead, from material obtained from a person sick with the disease.¹⁰⁵ Although officials condemned the practice, they did not as yet question the effectiveness of the calf lymph vaccine then in use throughout the country and elsewhere in Africa.

A breakthrough in medical technology came in the late 1950s in the form of a new dried type of smallpox vaccine. Unlike calf lymph vaccine, the new product was resistant to heat while in the dry state.¹⁰⁶ An urgent order was placed with the suppliers in England in the expectation that it will be used countrywide. Officials now found the calf-lymph vaccine ineffective. By January 1958, the Resident Commissioner happily informed the Deputy High Commissioner that: 'the lymph used for vaccination deteriorates rapidly in hot weather and is usually carried without refrigeration mostly on foot and canoes.'¹⁰⁷ Three months later, the Medical Officer of Health, Dr. B. O. Wilkins also found the lymph to be defective when, despite previous vaccinations, an outbreak of smallpox occurred in the Chobe district. 160 cases and 6 deaths were reported and the disease was traced to Angola, where no action was being taken against the malady. Dr. B. O. Wilkins attributed the low mortality to a mild outbreak of the disease and to other concurrent maladies -notably the highly endemic malaria.¹⁰⁸ People responded well and the revaccination campaign was considered a great success. 10% of the vaccinations in adults and children showed a higher and satisfactory result

because of the new dried vaccine, which had a quicker reaction than the usual calf lymph.¹⁰⁹

The production of a suitable smallpox vaccine in Britain and its recent use in Botswana must have enhanced the credibility of the British in the eyes of Africans. Even the World Health Organisation was confident that smallpox eradication was on track in Africa. Similarly, in April 1959, the Resident Commissioner pronounced that 'smallpox was not endemic in the country and that the last case was recorded in March 1958 when infection entered the territory from outside.' To him, an apparent absence of the disease suggested that 'no eradication measures of the disease were necessary and no financial assistance were required.'¹¹⁰ By September 1959, the Deputy High Commissioner was notified that:

Autochthonous cases of smallpox appear to have ceased in the Bechuanaland Protectorate. At irregular intervals imported cases occur. Their contacts are sought and vaccinated together with all other persons who voluntarily accept vaccination in the vicinity and is not legally made compulsory. It is generally accepted by the African population in villages and districts.¹¹¹

While co-operation between the government and the governed augured well for the eradication of smallpox in Botswana, foreign carriers of the disease posed the greatest danger. In March 1964, South African health authorities reported 10 cases of smallpox in Port Elizabeth. They found the carriers to have been a woman and six children from Blantyre, Malawi who travelled by train through the Bechuanaland Protectorate (now Botswana).¹¹² By land, sea and air disease including HIV/Aids have often been exported to other countries and to other continents and Botswana is no exception. Not surprisingly, a virulent outbreak of smallpox that hit the border village of Maitengwe, about 160 kilometres northwest of Francistown had an external origin. With a population estimated at 2641, Maitengwe had about 32 known cases of smallpox and 30 reported deaths in 1964. Although the village was said to be 'an isolated and comparatively inaccessible place,' health officials were determined to stamp out the disease there. Armed with the new dried vaccine officials led by Health Inspector, W. K P. Smith were confident that: 'there is every hope of containing the epidemic'. And contain it they did, through an intensive vaccination campaign preceded by quarantine measures by which people without recent successful vaccination were not allowed in or out.¹¹³ Attendance must have been good because people now realized that successful vaccination protected them against smallpox.

Conclusion

Between 1930 and 1942 Botswana experienced mild forms of smallpox and people used traditional methods to control this disease. From November 1943 however, the disease assumed pandemic forms and killed more people than ever before. Almost immediately Botswana's attitudes towards smallpox changed drastically. More and more people now accepted and readily presented themselves for vaccinations against smallpox. Such cooperation on the part of the Botswana coupled with the tireless efforts of medical authorities to control the disease, and more importantly, the discovery of a new and effective smallpox vaccine in Britain in the 1950s and its subsequent use in Botswana, enabled the administration to eradicate smallpox in the country by 1964. This study suggests that Botswana's attitudes towards disease is often characterised by indifference and ignorance. Until a particular disease becomes more severe and claims more lives Botswana usually take it for granted. Thus important lessons for tackling the current HIV/AIDS pandemic may be learned from these historical questions and comparisons with past pandemics (Molefi 2001).

Notes

- ¹ Source: BNA.S. 102/1, Medical Officer, Francistown to Principal Medical Officer, Mafeking, 27.12.1937.
- ² BNAS., 102/1, *The Star*, Johannesburg, 3.12.1937.
- ³ *Ibid.*
- ⁴ *Ibid.*
- ⁵ *Ibid.*
- ⁶ *Ibid.*
- ⁷ *Ibid.*
- ⁸ *Ibid.*
- ⁹ *Ibid.*
- ¹⁰ BN.AS102/1, Acting PMO Mafeking to DMS, Salisbury, 11.11.1937
- ¹¹ *Ibid.*, Acting PMO Mafeking to DMS, Salisbury, 6.10.1937
- ¹² *Ibid.*, Acting PMO Mafeking to DMS, Salisbury, 2.12.1937
- ¹³ *Ibid.*, Acting PMO Mafeking to DMS, Salisbury, 11.11.1937
- ¹⁴ *Ibid.*, Acting MO Salisbury to DMS, 22.11.1937
- ¹⁵ *Ibid.*
- ¹⁶ *Ibid.*, Acting MO Salisbury to PMO, Mafeking 2.12.1937
- ¹⁷ *Ibid.*, MO Francistown to PMO, Mafeking, 15.12.1937
- ¹⁸ *Ibid.*, MO Francistown to PMO, Mafeking, 15.12.1937
- ¹⁹ *Ibid.*, MO Francistown to PMO., 20.12.1937
- ²⁰ *Ibid.*, MO Francistown to PMO to GS., 20.12.1937
- ²¹ *Ibid.*
- ²² *Ibid.*, MO Francistown to PMO, 5.1.1938
- ²³ *Ibid.*, Letter to Tshekedi Khama, 13.8.1938.
- ²⁴ BNAS., 102/1, Acting DC Mochudi to GS., 18.3.1938.
- ²⁵ *Ibid.*, PMO to GS., 11.4.1938
- ²⁶ *Ibid.*
- ²⁷ BNSA., 102/2 PMO to the Secretary for Public Health Pretoria, 17.8.1938
- ²⁸ *Ibid.*, RC to HC, 13.5.1938; PMO to GS., 10.3.1938
- ²⁹ BNSA. 102/1, Sheperd To PMO 23.7.1938
- ³⁰ *Ibid.*, MO Lobatse to PMO., 7.7.1938
- ³¹ *Ibid.*, Ellenberger to PMO., 7.7.1938
- ³² *Ibid.*, MO Mochudi to PMO., 5.8.1938 and MO Mahalapye to PMO., 4.8.1938
- ³³ *Ibid.*, Sheperd to PMO., 1.8.1938
- ³⁴ *Ibid.*, MO Mochudi to PMO, 5.8.1938; Acting DC Kanye to PMO., 14.7.1938.
- ³⁵ *Ibid.* Acting DC Kanye to PMO 17.6.1938
- ³⁶ *Ibid.*
- ³⁷ *Ibid.*, PMO to DC Maun, 24.7.1938
- ³⁸ BNSA., 102/2, Meetig of PMO, Assistant DC., MO and DC Serowe, 3.11.1943
- ³⁹ BNSA. 102/1, Secretary Transvaal Chamber of Mines to PMO., 16.6.1938.
- ⁴⁰ *Ibid.*, Acting DC Maun to GS, 13.6.1938
- ⁴¹ *Ibid.*
- ⁴² *Ibid.*
- ⁴³ *Ibid.*, Squires to PMO, 13.7.1938
- ⁴⁴ *Ibid.*
- ⁴⁵ *Ibid.*
- ⁴⁶ BNSA. 102/2, minutes of the 20th Session of the African Advisory Council 6-10th.
- ⁴⁷ *Ibid.*
- ⁴⁸ *Ibid.*
- ⁴⁹ BNSA. 102/2, Squires to PMO., 7.12.1938
- ⁵⁰ *Ibid.*, Squires to PMO., 7.12.1938

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- ⁵¹ *Ibid.*, Squires to PMO, 23.11.1938
- ⁵² *Ibid.*, Ludwin to PMO, 6.10.1941
- ⁵³ *Ibid.*, Secretary for Public Health
- ⁵⁴ *Ibid.*
- ⁵⁵ *Ibid.*
- ⁵⁶ *Ibid.*
- ⁵⁷ *Ibid.*
- ⁵⁸ BNAS 102/1, Acting DC Mochudi to GS., 18.3.1943.
- ⁵⁹ BNAS.102/3, Annual Medical and Sanitary Report, 1943.
- ⁶⁰ BNAS. 393/1/1, Minutes of Meeting of HC and Tswana Chiefs, 14.10.1943.
- ⁶¹ BNAS. 102/2, meeting of Acting PMO; Asst DC and MO Serowe at Mafeking, 3.11.1943.
- ⁶² *Ibid.*, Annual Medical and Sanitary Report, 1938.
- ⁶³ *Ibid.*, Acting PMO to MO Serowe, 9.10.1943.
- ⁶⁴ *Ibid.*, MO Serowe to PMO, 12.10.1943.
- ⁶⁵ *Ibid.*
- ⁶⁶ *Ibid.*, Acting PMO to DC Serowe, 15.10.1943.
- ⁶⁷ *Ibid.*
- ⁶⁸ *Ibid.*
- ⁶⁹ BNAS. 102/2 Mackenzie to Tribe, 21.1.1944.
- ⁷⁰ BNAS. 102/3 Annual Medical and Sanitary Report, 1943.
- ⁷¹ BNAS. 102/2, Health Inspector to DDMS, 17.1.1944.
- ⁷² BNAS. 102/3, Annual Report by W. H. Cairns, 20.6.1945.
- ⁷³ *Ibid.*, R. R. Booth to DDMS., 4.11.1944
- ⁷⁴ *Ibid.*, MO Francistown to DDMS, 14.3.1944.
- ⁷⁵ *Ibid.*, DC Serowe to DDMS., 31.7.1945
- ⁷⁶ BNAS., 102/5, DDMS., Report on Smallpox, 26.1.1951.
- ⁷⁷ BNAS. 102/3, Acting DC Kanye to DDMS., 6.7.1944.
- ⁷⁸ *Ibid.*, RC to Admin Secretary, 7.8.1944.
- ⁷⁹ *Ibid.*, Health Inspector to DDMS., 15.9.1944.
- ⁸⁰ BNAS, 102/5, Pickles to GS, 8.5.1947.
- ⁸¹ *Ibid.*
- ⁸² *Ibid.*
- ⁸³ *Ibid.*
- ⁸⁴ *Ibid.*
- ⁸⁵ *Ibid.*
- ⁸⁶ *Ibid.*
- ⁸⁷ *Ibid.*
- ⁸⁸ *Ibid.*
- ⁸⁹ *Ibid.*, Bathoen to DC., Kanye 20.4.1949.
- ⁹⁰ *Ibid.*
- ⁹¹ *Ibid.* DC Molepolole to DMS., 30.10.1950
- ⁹² *Ibid.*, DMS to GS., 24.1.1951.
- ⁹³ *Ibid.*, MO Maun to DMS, 15.11.1950.
- ⁹⁴ *Ibid.*, Teichler to DC Mochudi, 10.11.1950.
- ⁹⁵ *Ibid.*, MO Maun to DMS, 15.11.1950.
- ⁹⁶ *Ibid.*, Teichler to DC Mochudi, 10.11.1950.
- ⁹⁷ *Ibid.* DMS to GS., 24.1.1951.
- ⁹⁸ *Ibid.*
- ⁹⁹ *Ibid.*, DMS to GS, 1.4.1947.
- ¹⁰⁰ *Ibid.*, Medical Report – Kgalagadi District, January – February, 1951 by Dr A. D. F. Moikangoa.
- ¹⁰¹ *Ibid.*
- ¹⁰² *Ibid.*
- ¹⁰³ *Ibid.*
- ¹⁰⁴ *Ibid.*
- ¹⁰⁵ *Ibid.*

- ¹⁰⁶ BNAS. 102/6, DMS to Div Comm (North), 18.12.1957.
¹⁰⁷ *Ibid.*, RC to DHC, 16.01.1958.
¹⁰⁸ *Ibid.* MOH's Report on Chobe District, 21.3.1958
¹⁰⁹ *Ibid.* Maghew-Ridgers to DMS., 21.3.1958.
¹¹⁰ *Ibid.*, RC to DHC, 29.4.1959.
¹¹¹ *Ibid.* Reply to DHC on Smallpox Eradiction, 12.9.1959.
¹¹² *Ibid.* Note No. 659 by SJO Henn, 14.10.1964.
¹¹³ *Ibid.* DMS., to Member for Tribal Affairs and Social Services 13.10.1964.

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