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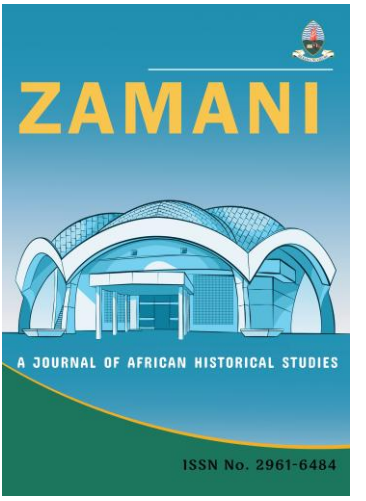

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Research Article: 'Prevention is Better Than Cure': Smallpox Vaccination in Postcolonial Tanzania, 1961–1980.

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‘Prevention is Better Than Cure’: Smallpox Vaccination in Postcolonial Tanzania, 1961–1980

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Abstract

This article examines the smallpox vaccination programme in postcolonial Tanzania from the 1960s to the early 1980s as part of the postcolonial future making in preventive medicine. The article departs from extant scholarship on smallpox vaccination in postcolonial Tanzania, which depicts the intervention as a success, while relegating to the background challenges associated with the intervention. The article argues that the smallpox vaccination programme registered challenges and successes that offer lessons for combating of future epidemics. The achievements of the programme were due to the adoption of specific public health policies, namely mass vaccination and public health education as well as reception of external assistance from the World Health Organization and donor countries, the use of ten cell house structure, and political mobilization. The obstacles included administrative, transport, and cultural problems. The article adds to the historiography of public health in Tanzania, and it has the potential of offering lessons on dealing with present and future epidemics, especially Covid-19 and Mpox.

Keywords: epidemics, smallpox, vaccination lessons, medical futures, postcolonial Tanzania.

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Introduction

> The party’s [TANU, MS] objective is to speed up the expansion of health services especially in the villages. But the Party also realises that encouraging people to take preventive action against disease is a step that will bring quicker results and less expense. Many diseases which are the cause of large number of deaths can in fact be prevented.[1]

[1] “Electing a Parliament for Party Consolidation: Election Manifesto,” *Daily News*, October 8, 1975. Tanganyika African National Union (TANU) was a political party that was formed in 1954 to fight for the independence of Tanganyika from British colonial rule. It became the

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The above quotation captures the policy of the ruling party and the Tanzanian government on the prevention of diseases after independence. It shows that the political actors believed that successful health future-making processes were dependent on state-people cooperation and initiatives. One area that was viewed as critical was preventive medicine. Soon after independence, Tanzania[2] carried out extensive programmes against communicable diseases through immunisation and public health education by disseminating knowledge to the public on how to prevent and combat diseases. One such programme, that combined both immunisation and public health education, was an anti-smallpox campaign in the 1970s under the theme "prevention is better than cure" (*kinga ni bora kuliko tiba*).[3] Despite the campaign, a detailed historical analysis of smallpox prevention through public education and vaccination in Tanzania is missing from the extant literature. There are few studies that have touched on the anti-smallpox campaign, mentioning in passing the successes and shortfalls of smallpox vaccination.[4] An exception is Babuel Lyimo's pioneering work on public health, in which he dedicates an analysis, albeit in a chapter, of the WHO's smallpox campaign, obstacles and lessons to be learned from the Tanzanian experience.[5] However, his chapter has rendered silent the agency of the government and international donors. Thus, this article undertakes a holistic analysis of successes and challenges of smallpox vaccination in

ruling party after independence from 1961 to 1977. In 1977, the party merged with the Afro-Shiraz Party (ASP) of Zanzibar to form Chama Cha Mapinduzi (CCM).

[2] In this article this refers to mainland Tanzania. The author did not research smallpox in Zanzibar due to time and resource constraints.

[3] Letter from Regional Medical Officer, Mara to the Senior Heath Education Officer, Ministry of Health, Dar es Salaam, "Semina ya Kinga ni Bora kuliko tiba inayoendeshwa kwa Msaada wa UNICEF Mkoa wa Mara," August 23, 1975 in Tanzania National Archives, hereafter TNA, TNA, 450/HEL/20/5. Such seminars were conducted in all twenty administrative regions of Tanzania.

[4] Wenceslaus Kilama, Aloysius Nhonoli, and Wilson Makene, "Health Care Delivery in Tanzania," in *Towards Ujamaa: Twenty Years of TANU Leadership*, ed. Gabriel Ruhumbika (Dar es Salaam: East African Literature Bureau, 1974), 201–202; Wilbert K Chagula and Edith Tarimo, "Meeting Basic Health Needs in Tanzania," in *Health by the People*, ed. Keneth W Newell (Geneva: WHO, 1975), 152; John Iliffe, *East African Doctors* (Cambridge: Cambridge University Press, 2002), 206; Lucian Msambichaka et al., *Economic Adjustment Policies & Health Care in Tanzania* (Dar es Salaam: Economic Research Bureau, 1997), 44–50.

[5] Babuel A Lyimo, *From Smallpox to AIDS: Public Health Services at Grassroots Levels in Tanzania 1955-1995* (Bergen: Centre for International Health, University of Bergen & Institute of Nutrition Research, University of Oslo, 2001), 157–169.

Tanzania. It posits the smallpox vaccination campaign as a health future-making process that involved multiple actors.

The article answers two specific questions: what were the successes and challenges of smallpox vaccination in Tanzania from independence to the early 1980s? What lessons did smallpox vaccination offer to the future prevention of epidemic diseases in Tanzania? To answer these questions, the article is divided into three sections. The first part gives a view of smallpox aetiology and prevalence in Tanzania. The second section focuses on successes and challenges of smallpox vaccination, and the last part is a conclusion consisting of a reflection on lessons that can be learnt from the past processes on preventive medicine, in this case: the smallpox vaccinations of the 1970s and 1980s.

Smallpox Aetiology and Prevalence

Smallpox emerged in the tenth millennium BCE when agricultural settlements emerged in ancient Egypt, China, India, and Greece. In ancient Egypt, for instance, lesions resembling smallpox have been found among mummies of the second millennium BCE, including Pharaoh Ramses V, who died in 1157 BCE.[6] Since its emergence in antiquity up until the 1970s, the disease had become widespread in many parts of the world. Smallpox is caused by variola viruses. There are three clinical forms of smallpox: variola major, minor (*alastrim*), and *intermedius.* While variola major was prevalent in Europe and Asia with a mortality rate (MR) of 20-40 percent, variola minor was widespread in Latin America and Southern Africa and had a MR of less than 1 percent, whilst variola *intermedius* was common in other parts of Africa, with a MR of between 2.8-109 percent.[7] Despite these distinctions, a confluence of the three viruses was common.[8]

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[6] William H Forge, *House on Fire: The Fight to Eradicate Smallpox* (Berkeley: University of California Press, 2011), 25. It is, however, important to note that the diagnosis of smallpox from ancient human remains is problematic. It is difficult to differentiate smallpox lesions from those of other diseases, including plague and tuberculosis. Indeed, ancient documents lumped together many diseases as smallpox.

[7] Marc H Dawson, "Socioeconomic Change and Disease: Smallpox in Colonial Kenya, 1880–1920," in *The Social Basis of Health and Healing in Africa*, edited by Steven Feierman and John Janzen (Berkeley: University of California Press, 1992), 91.

[8] DG Conacher, "Smallpox in Tanganyika 1918-1954," *East Africa Medical Journal* 34, no. 5 (1957):
163.

There are two transmission routes of the infection, namely respiratory and contact modes. The former entails the spread of a virus from host to host through the respiratory system, whereby droplets from an infected to a healthy person are transmitted when sneezing and coughing. Contact mode involves the transmission through direct and passive contact with contaminated objects like clothing, shrouds, and bedding, like blankets recently soiled with pus or scabs.[9] The incubation period of smallpox lasts ten to twelve days before an infected person displays symptoms. However, an individual's immunity system determines the incubation period. The symptoms of the diseases are likely to set in late for a person with higher body immunity than a person with low immunity. Symptoms in the initial period of three to four days include fever, muscle pain, headache, and malaise but on days 12 to 15 after the incubation, the patient starts to get rashes, pimples or blisters, vision problems, and pustules, which turn into scabs, vomiting, and a rapid temperature rise. The mouth of a patient becomes dry, and s/he has trouble breathing and usually becomes delirious.[10] If it is a variola major, internal body haemorrhaging begins, leading to death; if it is a variola minor, the patient survives with a scarred or pocked face, or blindness. Moreover, a patient who survives the attack acquires lifelong immunity against the disease.[11]

Apart from acquired immunity resulting from suffering from the disease, smallpox prevention involved inoculation and vaccination. Vaccination means injecting attenuated smallpox or cowpox and other viruses to a healthy person to induce bodily immunity that will protect the person in question against variola viruses that cause smallpox. Inoculation (or variolation) entails injecting a smallpox matter like pus into the body of a healthy person to trigger a mild form of the disease, thus rendering immunity to an individual. Prior to the nineteenth century, when vaccination took hold, many societies in India, China, and Africa, including Tanzania, carried out inoculation against the disease. In China, for example, ground scabs were blown into the nostrils of individuals by using tubes. In

[9] Donald Hopkins, *The Greatest Killer: Smallpox in History* (Chicago: The University of Chicago Press, 1983), 789.
[10] Russel S Viljoen, "Disease and Society: VOC Cape Town, its People and the Smallpox Epidemics of 1713, 1755 and 1767," *African Historical Review* 27, no. 1 (1995): 24.
[11] Hopkins, *Greatest Killer*, 13.

India and many African societies, insertion of pus from a smallpox patient into cuts made on the skin ('scarification') of a healthy person was common. Children were also exposed to smallpox organisms from adult persons suffering from mild smallpox.[12] By the early eighteenth century, variolation had reached Europe and America. Despite its usefulness, variolation had its flipside in possibly spreading diseases, as unattenuated variola viruses were used.[13] To redress this, vaccination started using orthopox viruses such as cowpox, modified pox-vaccinia, horsepox, rabbitpox, monkeypox and so forth. Vaccinia and cowpox were the most used vaccines. Vaccination started in England, as illustrated by Edward Jenner's vaccination in the late eighteenth century (1796) of James Phipps, and in the late nineteenth century, vaccination was brought to Africa via colonialism.[14]

Smallpox was one of the major health threats during the colonial period and continued to spread after independence in 1961. The annual report of the Health Division documented an increase of smallpox cases in 1961 in all parts of Tanzania and that such an increase was associated with the famine[15] (See map below). Three years later, it was reported that incidences of smallpox in the territory increased, despite intense efforts of vaccination.[16] The reasons for the increase are accounted for in the section below. However, number of deaths and smallpox cases for the years 1962, 1963, 1964, and 1966 showed unstable fluctuations of increase and decrease. It was from 1967 that smallpox cases and deaths began to decline sharply. From 1970 onwards, smallpox was eradicated in Tanzania as Table 1 indicates below.[17] In the 1970s and1980s, smallpox vaccination was incorporated into the routine national vaccination programmes among

[12] Helge Kjekshus, *Ecology Control and Economic Development in East African History: The Case of Tanganyika 1850-1950* (Dar es Salaam: Mkuki na Nyota, 1996), 132; Pascal J Imperato and Gavin H Imperato, "Smallpox Inoculation (Variolation) in East Africa with Special Reference to the Practice Among the Boran and Gabra of Northern Kenya," *Journal of Community Health* 39, no. 6 (2014): 1053–1062; William H Schneider, "Smallpox in Africa During Colonial Rule" *Medical History* 53 (2009), 198; Forge, *House on Fire*, 29; Eugenia W Herbert, "Smallpox Inoculation in Africa," *The Journal of African History* 6, no. 4 (1975): 539–559.

[13] Arno Karlen, *Plague's Progress: A Social History of Man and Disease* (London: Gollancz, 1995), 141–142.

[14] Frank Fenner et al., *Smallpox and its Eradication* (Geneva: WHO, 1988), 282.

[15] Ministry of Health, hereafter MoH, *Annual Report of the Health Division*, 1961, Vol. I, 1.

[16] MoH, *Annual Report of the Health Division, 1965*, Vol. I, 2.

[17] Lyimo, *From Smallpox to AIDS,* 162.

children and pregnant women. The incorporation of vaccination into prenatal and natal programmes aimed to sustain the success of smallpox eradication by ensuring the prevention of children and newborns from the disease. This policy, among many others, resulted in the success of the campaign against smallpox.

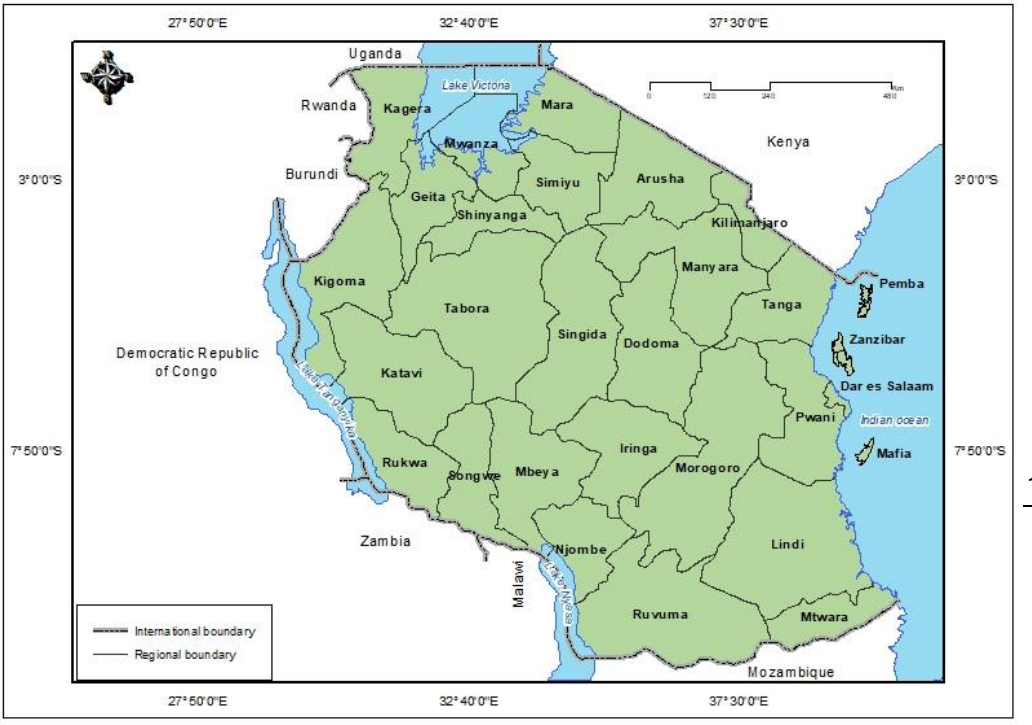

Figure 1: Administrative Regions of Tanzania
Source: Sauda Kilewo, Cartographic Unit, University of Dar es Salaam.

Year	Cases	Deaths
1961	191	11
1962	591	31
1963	677	10
1964	1461	102
1965	2762	213
1966	521	0
1967	1629	150
1968	454	16
1969	117	16
1970	32	0
1971	0	0
1972	0	0
1973	0	0

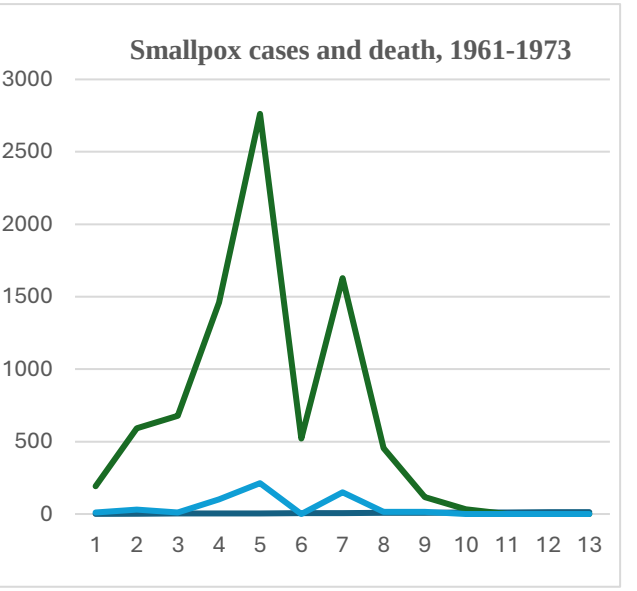

Figure 2: Smallpox Cases and Deaths, 1961-1973

Sources: Adapted by author using data by Kilama, Nhonoli, and Makene, "Health Care Delivery,"; Lyimo, From Smallpox to AIDS; Annual Reports of the Health Division.

The Age of Smallpox Demise in Tanzania

As in the colonial period, the postcolonial Tanzanian government used varied approaches to combat endemic and epidemic diseases, including public health campaigns, isolation and or quarantine, sanitary and hygiene measures, and vaccination.[18] The approaches entailed the involvement of multiple actors in the fight against diseases including the government, local communities, and external actors, such as the WHO and donor countries. Thus, the eradication of smallpox depended upon the involvement of multiple actors, in a context where, unlike during the colonial time, the government had people's legitimacy following the independence. This context was the bedrock for the success of the eradication of smallpox.

From the early 1970s, there was a notable decline in the cases and deaths associated with smallpox. This was an indication that vaccination

[18] The approaches had been used to control epidemic and endemic diseases such as sleeping sickness, malaria, and cholera.

and mass mobilisation against smallpox were becoming successful. Acknowledging the success of eradication of smallpox through vaccination in a patriotic overtone, Wenceslaus Kilama and his colleagues noted in the early 1970s that:

> This is indeed a great achievement which should be a source of pride and encouragement to the Ministry of Health personnel. This unprecedented success in Tanzania's health history should serve to point out new areas and methods of attack. However, this success must not be a cause for complacence; smallpox is still highly endemic in certain countries.[19]

Despite the acknowledgment of the success, these scholars have not examined the forces at work for the decline. It is argued in this article, that the success was linked to health policies in general and smallpox policies in particular, political mobilisation, and international anti-smallpox support.

The national health policy of smallpox vaccination was critical in bringing success to the anti-smallpox campaign. Before delving into the policy, it is proper to define a policy. Although there are many definitions of health policy,[20] this article's understanding, in line with Meredeth Turshen,[21] is that a policy includes government decisions, directives, strategies, plans, and goals for controlling diseases, or provision of health services and care. The definition in this article is applied in the understanding of smallpox vaccination in Tanzania. In the early 1960s, Tanzania continued with the colonial strategy of establishing a ring of containment. This strategy entailed first vaccinating contacts of a smallpox case from a family of a particular locality, and then spreading outward to individuals surrounding the area of an outbreak of the disease for five days, after which re-vaccination started again at the centre. The vaccination aimed at preventing the spread of the disease to other areas from a focus area.[22] For example, following an outbreak of smallpox in 1963 along the border between Tanganyika and Northern Rhodesia, an intensive vaccination campaign took place along the border from Mbeya to

[19] Kilama, Nhonoli, and Makene, "Health Care Delivery," 201-202.
[20] https://encyclopedia.thefreedictionary.com/Health+Policy , accessed March 10, 2024.
[21] Meredeth Turshen, *The Politics of Public Health* (New Brunswick, NJ: Rutgers University Press, 1989) 50.
[22] Conacher, "Smallpox in Tanganyika," 177.

Sumbawanga.[23] Similarly, in Arusha in 1964, the outbreak of six smallpox cases in April, leading to one death, prompted regional authorities to vaccinate school children and anyone who wished to be vaccinated.[24]

However, the containment strategy changed in May 1965, when intensive mass vaccination campaigns against smallpox started in all regions of the territory. The change of strategy was a result of learning from the success of vaccination programmes that covered whole districts in the Lake Victoria region that had started from 1961 to 1965.[25]Another reason was the WHO's recommendation, which was based on the success stories of mass vaccinations against smallpox from the USA and Latin America.[26] Mass vaccination entailed vaccinating the whole or nearly all the targeted population in a locality such as a village. WHO boosted the strategy in the late 1960s. The WHO-engineered mass vaccination programmes started as a pilot study in the Geita district in the Mwanza Region in July 1968 but extended all over the territory in November 1968 and was called 'smallpox attack phase.' By 1970, Tanzania had eradicated smallpox and wrapped up the campaign in 1971.[27] To implement the mass vaccination strategy, the WHO recommended the vaccination of 80 percent of each targeted sector of the population[28] such as the children, youth, or adults in a locality. Below is an illustration of the ring and mass vaccination:

[23] MoH, *Annual Report of the Health Division, 1965*, Vol. I, 3.
[24] Saving Telegram from REGMED to HEALTH MIN, SMALLPOX, April 13, 1964 in TNA, 450/HED/130/2: Smallpox Arusha Region 1955-1977.
[25] Letter from District Medical Officer to Regional Medical Officer, "Smallpox - Geita District," May 20, 1965 in TNA, 450/HED/130/13: Smallpox Mwanza, 1965-1967.
[26] TNA, 450, WHO/Smallpox/10: "Organization of a Smallpox Eradication Service," July 7, 1959.
[27] Lyimo, *From Smallpox to AIDS*, 168.
[28] TNA, 450, WHO/Smallpox/10: "Organization of a Smallpox Eradication Service," July 7, 1959, 2, 1.1.

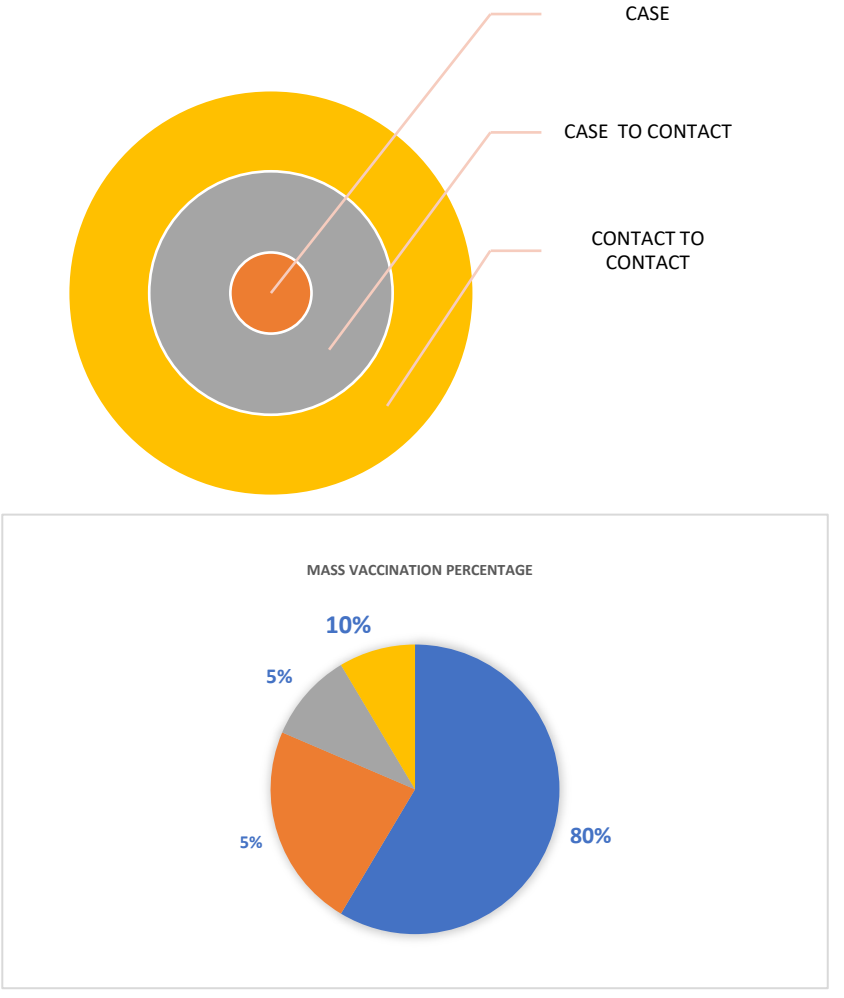

Figure 3: Ring and Mass Smallpox Vaccination
Source: Author's reconstruction

An extract from the Ministry of Health on instructions for mass immunisation illustrates the reckoning of the percentage and number of a target group for vaccination in a given locality, such as a village. Suppose the target group for vaccination were children in a village of 10,000 people with 3 percent of children, this meant the number of children for vaccination would be 300 children. For vaccination on a monthly basis, the figure could

be disaggregated into 25 children per month in a year.[29] Or if 80 percent was the target, the number would be 240 children with 20 children vaccinated per month. The similar principle was applied for other population segments such as youths and adults.

The mass vaccination strategy registered tremendous success for eradicating smallpox all over the territory. Indeed, Tanzania surpassed the WHO's recommended target of 80 percent. Out of twenty regions, statistics from eight regions namely Mwanza, West Lake, Mara, Mtwara, Kigoma, Tabora, Shinyanga, and Arusha, that had a total population of roughly 4 million, registered an average of 93.3 percent vaccination coverage during the 'smallpox attack phase' from mid-1968 to September 1970. Only the two districts Nzega and Mpanda in the Tabora Region registered an average of 80.1 percent and 87.9 percent coverage respectively which was below the regional average.[30] One of the reasons for the low coverage in the districts was probably transport, since the districts were big, and their mobility infrastructures were extremely poor. During the mass vaccination, mobile vaccination teams played a key role. The WHO recommended that a team consist of between four and ten trained individuals made up of supervisors, vaccinators, and drivers who were responsible for vaccinating a specific locality.[31] But in Tanzania, a mobile team consisted of seven people: a health assistant, who was the team leader, five vaccinators and recorders, and a driver. One health officer was the coordinator, and the regional or district medical health officer were supervisors. Each district had three mobile teams with three cars, usually Land Rovers, for the transport of the teams to the villages, where mass vaccination took place on a house-to-house basis.[32] The mobile teams were trained in vaccination techniques, data collection, the reporting system, and basic sociology and psychology.[33] The team had to furnish vaccination reports in a specially designed form to the district, to regional authorities, and ultimately to the Ministry of Health.

[29] TNA, 450/HEL/20/5: "Object of Vaccination"
[30] TNA, 450/HEU/50/16B: Smallpox National Quarterly Record Vaccination, 1968-1970, "Tanzania 0043 Attack Phase - Smallpox and BCG Vaccination: Return Received as at 30th September 1970."
[31] TNA, 450/WHO/Smallpox/10: "Organization of a Smallpox Eradication Service," 7.
[32] Lyimo, *From Smallpox to AIDS*, 168.
[33] Ibid.

Another critical reason for the success of the campaign was the abolition of payments for smallpox vaccination. A few months after the start of the smallpox attack phase, in July 1969, government officials started discussions on the abolition of vaccination fees at government and religiously owned health facilities. In August 1970, the government of Tanzania decided to abolish all payments and fees charged on smallpox vaccination and other communicable diseases namely tuberculosis, polio, tetanus, measles, typhoid, rabies, and plague in all government and voluntary agencies' health facilities.[34] The government directed that:

> In this Office's [Principal Secretary's, MS] circular memo No. HEL/20/5/5676 of 9.7.1969, addressed to all Regional Medical Officers and copied to various addresses, you were informed of the intention of this Ministry to abolish fees or payments for certain types of vaccination. As some of you will be already aware, a decision has now been taken on this matter and the Minister recently announced in Parliament that all forms of vaccination which are used in this country as weapons for controlling communicable diseases are to be provided free of charge at any suitable health establishment. The purpose of this memo is to draw your attention to this decision and to ask you to take necessary action to implement it in the area under your jurisdiction.[35]

The significance of the abolition of payments was in the provision of free access to vaccination for all people. It broke the class access to vaccines, and resonated well with the socialist ideal of free medical services to the masses. It was a critical drive in that it dented the future of smallpox in the territory. Below is the table that illustrates the vaccinations conducted in Tanzania between the 1960s and 1970s. The key issue to note from that table is a one-off decline of vaccinations in 1968 but a continuous steady rise of vaccinations from 1969 to 1971.

[34] Letter from the Principal Secretary, Ministry of Health to all Regional Medical Officers and the Medical Superintendent, Muhimbili Hospital, Dar es Salaam, "Immunisation and Supply of Vaccine," August 11, 1970 in TNA, 450/HEL/20/5/5772.
[35] Ibid.

Year	Vaccinations
1965	3,000,000
1968	707,050
1969	2,791,861
1970	3,863,736
1971	4,638,693

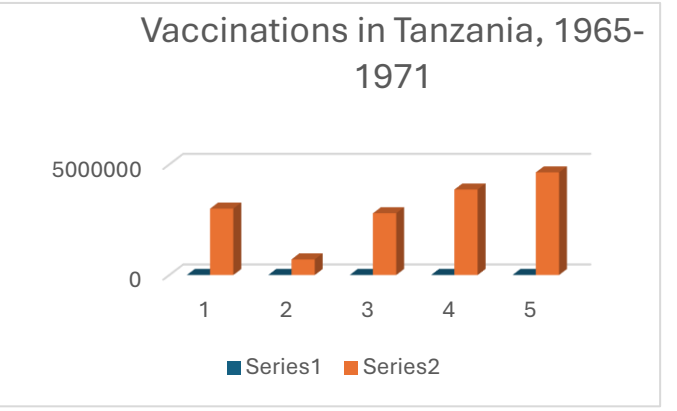

Figure 4: Smallpox Vaccinations in Tanzania, 1965-1971
Source: Adapted from Lyimo, From Smallpox to AIDS

Public health education was also an important factor for the success of smallpox vaccination. In 1967, the Minister of Health and Housing, Dr Austin Shaba, issued a directive to all ministers, junior ministers, and members of Parliament to educate their electorates in their constituencies during political rallies on health education, including smallpox vaccination.[36] Similarly, in 1969, the Minister of Health and Social Welfare, Mr LN Sijaona, reported during the 1969/70 budget speech to the Parliament that the ministry, in collaboration with UNICEF, showed a film on smallpox all over the territory.[37] The film showed the horrors of smallpox with the aim to spur citizens to get vaccinated against smallpox.[38] Apart from political meetings and film shows, public health education was conducted in educational centres. The Ministry of Health's annual report of 1962 recorded that, in the central region of Tanzania, particularly in the Kondoa and Dodoma districts, where there was an outbreak of smallpox in 1961, public health education was conducted, stressing the value of prophylactic vaccination and lectures, which were popular in schools and literary classes.[39] It is important to note that the conduct of health education in literary classes was attributed to the low level of literacy during the early years of independence.

[36], Letter from Minister of Health and Housing to all Ministers and Members of Parliament, June 23, 1967 in TNA, 450/HED/130/13: Smallpox Mwanza, 1965–1967.
[37] Majadiliano ya Bunge: Taarifa Rasmi, Mkutano wa Kumi na Saba, Sehemu ya Pili, 26 Juni–17 Julai, 1969, (Dar es Salaam: The Government Printer, 1970), 1649.
[38] Lyimo, *From Smallpox to AIDS*, 167.
[39] MoH, *Annual Report of the Health Division, 1962*, 5.

Moreover, political mobilisation was key to the success of smallpox vaccination in Tanzania. The TANU's ten-cell structure was vital for anti-smallpox campaigns. A ten-cell structure consisted of ten households (*shina*) in a village or street, which was under a party leader – popularly known in Swahili as *balozi*. The ten-house was an arena where, in addition to village meetings, vaccinators conducted public health education on smallpox vaccination. It was also a place for the reckoning of percentages of segments of population for vaccination. Additionally, a *balozi* was crucial for enlisting people's support for vaccination. A government report noted in 1965 that the decline of smallpox in the Shinyanga region was a result of the ten-house vaccination scheme.[40] Likewise, in 1968 a party newspaper reported that TANU party's cell leaders were important for the success of smallpox vaccination campaigns.[41]

Furthermore, the success of smallpox vaccination hinged on improved vaccines and vaccine administration technology. During the colonial period, vaccinators used a liquid vaccine lymph, which was harvested from cows and other animals. The vaccine had to be stored below 0 degrees Celsius to keep its potency. Indeed, lack of refrigeration facilities in rural areas was one of the main causes of non-reaction of many vaccinations. Yet, in 1966 a freeze-dried vaccine, manufactured from the evaporation of the liquid vaccine became common.[42] The advantages of the freeze-dried vaccine, which was in powder form, were numerous. Overall, it had high reaction success rate, ranging from 71 percent to 89 percent. It was also easy to keep, as it required only room temperature to remain viable.[43] By the early 1970s, the vaccine started to be industrially produced in many countries. The government of Tanzania, in cooperation with the Chinese government, built

[40] Letter from Regional Health Inspector, Shinyanga Region to the Reginal Medical Officer, "Smallpox Campaign on Ten House Basis", September 16, 1965 in TNA, 450/HED/130/15: Smallpox Shinyanga.
[41] "Smallpox Campaign," *The Nationalist*, April 5, 1969.
[42] Fenner et al., *Smallpox and its Eradication*, 282, 286; Schneider, "Smallpox in Africa," 212; According to Larson, "Smallpox Outbreak and Immunization" (Zamani 1, no 2, f*orthcoming*), German East Africa had achieved territorial self-sufficiency in producing the vaccine before the First World War. Furthermore, he observes that German East Africa was exporting the vaccine to neighbouring territories. The self-sufficiency was due to the government's policy of decentralised production whereby every district produced the vaccine.
[43] Schneider, "Smallpox in Africa," 212; Forge, *House on Fire*, 48.

a freeze-dried vaccine plant at Mabibo in Dar es Salaam in 1971.[44] The availability of the vaccine from the plant enhanced the Expanded Programme on Immunisation (EPI) in the 1970s and 1980s. The EPI was initiated to implement the World Health Assembly (WHA) Resolution 27.57 of May 1974 that called upon member states to immunise children against the six killer diseases namely measles, polio, tuberculosis, diphtheria, whooping cough, and tetanus.[45] The EPI was launched in 1975 and became part of the Universal Primary Health strategy[46] in 1983. Due to the availability of the nationally produced vaccines, smallpox vaccination was added to the programme and became part of the routine vaccinations. Thus, the vaccine factory was a huge initiative towards writing the future not only of vaccinations but also of medicine manufacturing in Tanzania. It ensured that the country's future medical supply was guaranteed.

There was an improvement on the needle for administering the vaccine. Until the late 1960s, lancets or needles were widely used to scratch, prick, or cut the skin onto which the vaccine was administered by either rubbing or releasing droplets. Yet, in 1965, Benjamin Rubin of Wyeth Laboratories in Philadelphia, USA invented the bifurcated needle.[47] The needle began to be used from 1968 onwards. By 1969, the bifurcated needles were popular in many parts of the world. The needles were made from simple steel with two tongs, which, when dipped into a vaccine vial, held enough vaccine for one vaccination – thus ensuring the adequate dosage of the vaccine. It was also easier to vaccinate using the needle, whereby a vaccinator only held a bifurcated needle at a right angle to the skin and pushed it into the skin, as the tongs prevented the needle from going too far into the skin. Furthermore, the needle provided take rates of 98 percent and could be re-used after sterilization.[48] In 1970, in Sumbawanga, it was reported that vaccinators received training on the new

[44] "Tanzania's Vaccine Plant Now Open, *"The Nationalist*, May 4, 1971.
[45] Msambichaka et al., *Economic Adjustment Policies*, 6.
[46] This entailed the provision of basic health care to all citizens, in line with the WHO's Alma Ata Declaration of 1978. See in World Health Organization*, Primary Health: Report of the International Conference on Primary Health Care, Alma-Ata, USSR, September 6-12, 1978* (Geneva: World Health Organization, 1978)
[47] Fenner et al., *Smallpox and its Eradication*, 568.
[48] Fenner et al., *Smallpox and its Eradication*, 472, 574; Forge, *House on Fire*, 101.

technique of multiple punctures with bifurcated needles.[49] Indeed, by the early 1970s, bifurcated needles were in common use in many parts of Tanzania. Testifying to the widespread use of the needles in 1974, the Health Education Officer of the Ruvuma region reported that bifurcated needles were in constant supply in the region.[50]

The success of the campaign was also attributed to external assistance. Tanzania received personnel, logistics and financial assistance from international organisations such as the WHO, and countries such as the USA, Norway, and China. The WHO was involved in the anti-smallpox initiative in Tanzania as early as 1967. For example, WHO personnel were sent to the Geita District to vaccinate citizens.[51] The WHO also financed the smallpox eradication campaigns that started in 1968, and supplied Land Rover cars for the transport of smallpox vaccination teams and vaccines in all regions of Tanzania. Furthermore, the WHO facilitated the training of personnel to undertake vaccinations, as it instituted the weekly epidemiological reports or 'infectious disease week endings' (IDWEs).[52]

In 1967, the US Peace Corps – in collaboration with the District Medical Officer (DMO) of the Rufiji district – was involved in the vaccination of school children. From November 6 to 13, 1967, they vaccinated 1693 people, mainly children (see figure 5 below).[53] Norway was involved in vaccination against many diseases in Tanzania, including smallpox in Arusha, through its Agency for Development Cooperation (NORAD). From April to June 1974, NORAD carried out a total of 8241 vaccinations at twenty-two centres.[54] China, too, was actively involved in anti-smallpox work in Tanzania. Besides assisting in the building of the smallpox vaccine plant as noted earlier, China sent its doctors in 1974, who participated in

[49] TNA, 450/HED/130/10: Smallpox Mbeya, 1946–1976, Dr RM Lyonnet, "Report on a Smallpox Outbreak in Sumbawanga (Mbeya Region)," April 1970.
[50] TNA, 450/HED/14: Smallpox Ruvuma, 1964–1974, "Immunisation Assessment Questionnaire," August 26, 1974.
[51] Letter from District Medical Officer to Permanent Secretary, Ministry of Health, "Wataalamu wa World Health Organization Kuchanja Ndui Wilayani Geita," March 21, 1967 in TNA, 450/HED/130/13: Smallpox Mwanza, 1965-1967.
[52] Lyimo, *From Smallpox to AIDS*, 162; "Smallpox Campaign," April 5, 1969.
[53] TNA, 450/HEL/20/5: Vaccine, 1963-1977, Report on Rufiji District Immunization, November 17, 1967.
[54] TNA, 45/HEU50/16E: Smallpox National Quarterly Record, 1973-1974, NORAD Project, April–June 1974.

mobile health teams that visited and vaccinated people against smallpox in dispensaries, village health posts, and *ujamaa* villages.[55] The litany of success that has been discussed so far should however not blind us from the challenges that were associated with smallpox vaccination. The challenges were multifaceted, ranging from logistical, economic, political to cultural. The section that follows details the drawbacks.

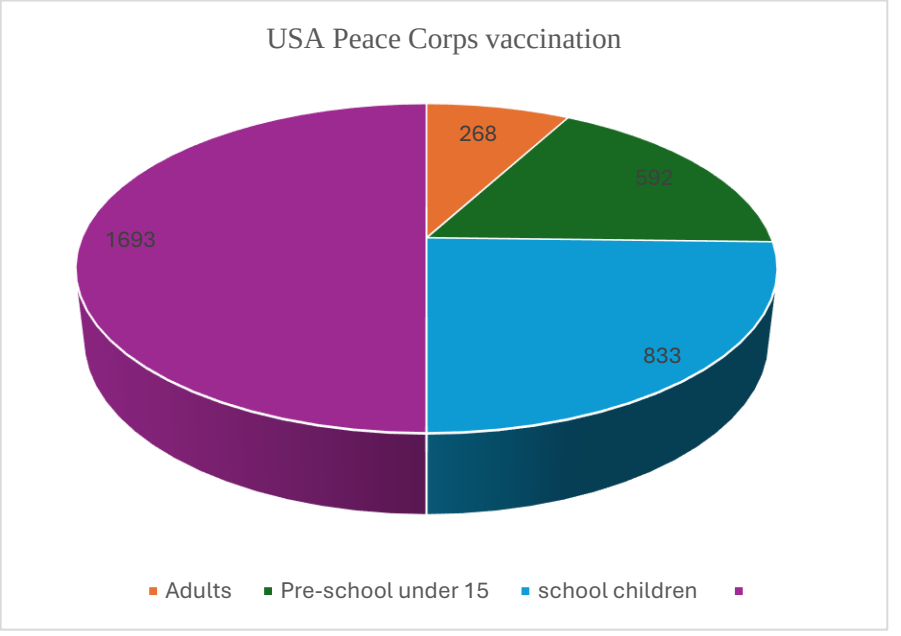

Figure 5: US Peace Corps Vaccination in Rufiji, 1967
Source: TNA, 450/HEL/20/5, Vaccine, 1963-1977: Report on Rufiji District Immunization.

Failed Futures in Smallpox Vaccination

One of the major challenges that had a pedigree from colonialism but continued even after independence, was the reluctance of some people to vaccinate against smallpox. In 1961, in the Kisarawe district in the Eastern region, only 40 percent of the population was vaccinated during the vaccination campaign. The turn-out for vaccination was very poor indeed, and concealment of smallpox cases or failures to report cases were

[55] Lyimo, *From Smallpox to AIDS*, 162; "Smallpox Campaign," April 5, 1969.

common.[56] It was also reported in 1965 that despite vaccination, smallpox cases in Tanzania continued to rise, partly because of the reluctance of certain members of the public to vaccinate.[57] In the same year, it was documented that the concealment of smallpox cases in the districts of Njombe, Kasulu, and Masasi led to the report of fewer cases than it should have been.[58] Again, a 1972 government report from the Ruvuma region noted that:

> you will probably note that although the attach phase vaccinations were completed in Songea only last year [1971, MS], a good population was missed). This was also supported by the Health Auxiliary of HANGA division who said attendance in vaccination in 1971 in Mawanga [a foci ward of smallpox outbreak, MS] was poor as the X Ward Executive Officer was uncooperative.[59]

In addition to indicating public reluctance to smallpox vaccination in the ward, the above quotation hints at the reason for the reluctance, namely a leadership problem, in that the Ward Executive Officer was uncooperative. Lack of cooperation from some leaders is traced to the early years of independence. It was reported in the Mbozi division of the Mbeya district in 1963 that health staff approached several *Jumbes* (village heads) and village Executive Officers to call vaccination *Baraza* (meetings) to educate people on vaccination, but the leaders did not cooperate. A letter was even written to the Area Commissioner of the Mbeya district, requesting him to instruct the *Jumbes* and Village Executive Officers to cooperate with the health staff.[60] However, both sources from Songea and Mbozi are silent on the reasons for lack of cooperation from the leaders. Hesitancy to vaccination was manifested in people's hiding or running away from vaccinators, as happened in 1963, when villagers in the Mbozi area of the Mbeya district

[56] MoH, *Annual Report of the Health Division, 1961*, Vol. I, 4.
[57] MoH, *Annual Report of the Division of Health, 1965*, Vol. I, 2.
[58] MoH, *Annual Report of the Division of Health, 1965*, Vol. I, 6.
[59] Letter from E. E. Lymo, Officer-in Charge-Smallpox Eradication Unit, Dar es Salaam to the Principal Secretary, Ministry of Health, Dar es Salaam, "Investigation of a Reported Case of Smallpox from Songea," December 23, 1972 in TNA, 450/HED/130/14: Smallpox Ruvuma 1964-1974.
[60] Letter from District Health Inspector, Mbeya, and Chunya Districts, to the Permanent Secretary, Ministry of Health, "Smallpox," December 2, 1963 in TNA, 450/HED/130/10: Smallpox Mbeya, 1946-1976.

ran away from vaccinators. A similar trend was observed in the Nyang'wale division of Geita District in 1967. [61] Referring to the situation in Mbeya and other districts of Tanzania, C. V. Mtawali, the Principal Secretary of the Ministry of Health, noted in 1965 that:

> The Minister [of Health, MS] was indeed worried when he heard the story of smallpox outbreak in Mbeya because although smallpox has been endemic for a number of years in different parts of this country, the position in some districts has been serious lately because people are running away from Vaccinators and some are even hiding obvious cases of smallpox in their houses. The Minister is, therefore, trying to visit these different districts in order to launch a propaganda campaign to induce people to come forward for vaccination and facilitate the isolation of diagnosed cases.[62]

The above quotation not only shows the problem of running away from vaccination but also proposes the introduction of health education to induce people to come out for vaccination, as well as bring out cases for isolation.

Isolation of smallpox cases, despite its medical value of preventing the spread of the diseases, was one of the reasons for some people's hesitancy to vaccinate. Isolation in medical facilities made a patient an outcast, not only from their family members, but also their community in general. An illustration of the handling of a suspected smallpox case comes from Mwanza, where a 13-year-old child was suspected to be infected with smallpox, which later turned out to be chickenpox. The child was isolated at an infectious ward in the Nansio District Hospital in September 1975. Nobody was allowed to see her, except vaccinated hospital staff.[63] No doubt this kind of isolation put off many people with symptoms of the disease to come forward, as isolation contradicted with African norms of caring the

[61] Letter from District Medical Officer to Permanent Secretary Ministry of Health, "Wataalamu wa World Health Organization Kuchanja Ndui Wilayani Geita," March 21, 1967 in TNA, 450/HED/130/13: Smallpox Mwanza, 1965–1967.

[62] Letter from Principal Secretary, Ministry of Health, Dar es Salaam, to the Regional Medical Officer, Mbeya, "Smallpox Outbreaks," November 10, 1965 in TNA, 450/HED/130/10: Smallpox Mbeya, 1946–1976.

[63] Letter from E. E. Lymo, Senior Health Education Officer, Preventive Services Division, Ministry of Health, Dar es Salaam to the Director of Preventive Medicine, Ministry of Health, Dar es Salaam, "A Report on a Suspected Case of Smallpox Isolated at Nansio District Hospital," (n.d.) in TNA, 450/HED/130/13: Smallpox Mwanza, 1965–1967.

sick. Indeed, it was reported in Kigoma in 1966 that smallpox patients freely mixed with other people in marketplaces, *pombe* clubs, and in their homes.[64] Another reason for hesitancy of vaccination was a cultural belief, especially among men, that smallpox vaccine caused sterility. In 1965, the Regional Health Inspector Report from Shinyanga noted:

> The only social problem encountered arose from the males who believed that smallpox vaccination interferes with reproduction in that perhaps it causes sterility. Many males in some stations did not turn up for vaccination due to this belief.[65]

Moreover, in 1965, medical authorities of the Maswa district in the Shinyanga region attributed hesitancy to vaccinate against smallpox to residents' consulting of traditional medicine.[66] Likewise in Kigoma in the early 1960s, it was reported that smallpox cases were not reported by the people. Instead, they were hidden in their homes for treatment by traditional doctors until such time when the patients were "terribly sick, then they could consider to send the patients to the dispensaries."[67] There was also hesitancy among believers in Christianity. Followers of the Christian Jehovah's Witness denomination refused to vaccinate against smallpox on religious grounds.[68] The running away in some places was also associated with villagers' perception that smallpox vaccinators were tax-collectors.[69] It is worth to note here that people's hesitancy to vaccinate speaks volumes of the local agency, that is, people are not passive recipients of external interventions but may evade, resist, accept, modify, sabotage, or

[64] Letter from Regional Medial Officer, Kigoma Region to the Principal Secretary, Ministry of Health, "Heavy Smallpox Outbreak – Kasulu," January 10, 1966 in TNA, 450/HED/130/7: Smallpox Kigoma, 1966–1970.
[65] Letter Regional Health Inspector, Shinyanga, to Regional Medical Officer, Shinyanga, "Smallpox Campaign on Ten Houses Bases," September 16, 1965 in TNA, 450/HED/130/15: Shinyanga Region, 1962–1969.
[66] Letter from Health Inspector, Dodoma, to the Principal Secretary, Ministry of Health, Dar es Salaam, "Re: Alleged Fifty-One Deaths from Smallpox in Maswa Shinyanga Region," February 9, 1965 in TNA, 450/HED/130/15: Shinyanga Region, 1962–1969.
[67] Letter from Regional Medial Officer, Kigoma Region to the Principal Secretary, Ministry of Health, "Heavy Smallpox Outbreak - Kasulu," January 10, 1966 in TNA, 450/HED/130/7: Smallpox Kigoma, 1966–1970.
[68] Lyimo, *From Smallpox to AIDS*, 168.
[69] District Health Officer, Mbeya District to the Permanent Secretary, Ministry of Health, December 2, 1963 in TNA, 450/HED/130/10: Smallpox Mbeya 1946–1976.

resist the interventions. As a way of resistance against forced smallpox vaccination in the Kasulu district in 1966, those who were forcibly vaccinated wiped off the lymph immediately after being vaccinated so as to prevent the vaccine from penetrating into the body.

Another problem was lack of staff, especially prior to 1968.[70] In 1965, a Regional Health Inspector in Shinyanga documented that there was an insufficient number of staff to deal with the thousands of people who needed smallpox vaccinations in different divisions in the region. He suggested that, ideally, there should be at "least four teams of three vaccinations (*sic*) each working at the same time in different divisions."[71] It is however important to note, that while the lack of staff was a challenge in the early 1960s, it became less of a problem with the start of the WHO campaign in 1968, which involved the training of vaccinators. The Ministry of Health's training of the community health workers, which started in 1968, eased the problem as well.[72] However, lack of payment to vaccinators continued to be a problem even after the 'smallpox attack phase' (1968-1970).[73] It meant that the staff were unavailable for work, which affected the plans to vaccinate the unvaccinated in rural areas as well as the newborn children in health centres.[74] Noting the problem of pay in 1973, the Senior Health Officer of the Iringa region reported that:

> Further difficulty was experienced when the fund to pay the salary for the three vaccinators [in Iringa district, MS] and the driver was not made available for such a longtime of waiting at least three months without pay with effect from the month of December, 1972.[75]

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[70] Generally, medical personnel in many regions of Tanzania were scarce. Iliffe, *East African Doctors*, 201 notes that in September 1965, out of 127 government posts for medical officers, 35 posts were vacant. It is, however, worth noting that during smallpox vaccination campaigns, the shortfall of medical personnel was filled up by training vaccinators.

[71] Letter from Regional Health Inspector, Shinyanga to Regional Medical Officer, Shinyanga, "Smallpox Campaign on Ten House Basis," September 16, 1965. TNA, 450/HED/130/15: Smallpox Shinyanga 1961–1969.

[72] Majadiliano ya Bunge: Taarifa Rasmi, Mkutano wa Kumi na Saba, Sehemu ya Pili, 26 Juni - 17 Julai, 1969.

[73] This was a period of smallpox eradication under the WHO.

[74] Letter from Senior Health Officer, Iringa, to the Regional Medical Development Officer, Iringa, May 15, 1973 in TNA, 450/HED/130/6: Smallpox Iringa 1964–1973.

[75] Ibid.

Apart from the problem of staff, there were logistical challenges as well, namely the lack of refrigerators for storing vaccine lymph. As noted earlier, before the availability of freeze-dried vaccines in the late 1960s, the lymph had to be stored in a refrigerator to maintain its potency. Yet, in rural areas, refrigerators were only available at the district headquarters. Thus, vaccinators who needed ice in their thermos had difficulties getting the supply of ice while in the field. Documenting this problem, medical authorities in Shinyanga recorded that there was a "problem to spot refrigerators in divisions [of Shinyanga, MS] for storage of vaccine and supply of ice."[76] Indeed, in some places the vaccinators had to drive for long distances in pursuit of the ice.[77]

Another challenge was lack of vehicles for transport, petrol, and funds for the vehicles' maintenance. Prior to the WHO 'smallpox attack phase' in the late 1960s, the supply of vehicles and funds for vaccination were great problems. In 1965, in Shinyanga the Regional Medical Officer reported lack of funds under a vote titled "plant, vehicle and transport,"[78] thus medical personnel failed to carry out a mass smallpox vaccination campaign in Maswa district. Similar issues were also reported in Mbeya in 1974. These funding problems additionally resulted in poor vehicle maintenance.[79] A similar fate befell the Njombe and Iringa districts. The chairperson of the Health Standing Committee noted in 1965 that lack of a Land Rover for transport "has been one of and may still be the major drawback at our control measure against smallpox." In Iringa in 1973, lack of fund for transport and maintenance of a Land Rover made it impossible for health personnel to undertake vaccination work, including vaccinating contacts of a smallpox case at Ihomasa village in the Wasa ward of the Iringa district. Inaccessibility of some areas due to impassable roads also hindered

[76] Regional Health Inspector, Shinyanga to Regional Medical Officer, Shinyanga, "Smallpox Campaign on Ten House Basis," September 16, 1965 in TNA, 450/HED/130/15: Smallpox Shinyanga 1962–1969.
[77] Ibid.
[77] Ibid.
[78] Letter from the Regional Medical Officer, Shinyanga Region to the Ministry of Health, Dar es Salaam, January 26, 1965. TNA, 450/HED/130/15: Smallpox Shinyanga.
[79] TNA, 450/HED/130/10: Smallpox Mbeya, 1946–1976, Immunisation Assessment Questionnaire, August 23, 1974.

vaccination campaigns.[80] A US vaccinating mission in the Rufiji district failed to get access to some schools due to this, for example.[81]

However, the major problem in 1972, which adversely affected smallpox vaccination campaign was lack of petrol. E. E. Lymo, the officer-in-charge at the Smallpox Eradication Unit of the Ministry of Health, reported on the failure of the Ruvuma Regional Medical Authorities to control an outbreak of smallpox at Mawanga in Songea as follows:

> Perhaps the major obstacle in this investigation and control measure was lack of petrol as implied in Regmed [Regional Medical Officer, MS] Songea's telegram referred earlier. It is reported that there has been an acute shortage of petrol in Songea for the last few weeks due to non-availability of stock in Mtwara/Masasi depots. During my visit [E. E. Lymo, MS] I saw the maintenance Land Rover together with vaccinators at Songea health office eagerly awaiting the arrival of petrol, lucky enough I arrived with 44-gallon drum of petrol I purchased at Iringa which eased the problem.[82]

The above quotation is significant as it shows the link of the campaign with both domestic and global economies. The scarcity of petrol occurred within the context of the global economic crisis of the 1970s, which was attributed to the rise of petroleum prices. This link speaks volumes to a classic association between diseases and their control with economy and politics.

Conclusion

This article has established that smallpox in postcolonial Tanzania registered successes as it faced challenges. The overarching success was the quick eradication of smallpox in the territory in 1970, just two years after the WHO launched its global vaccination campaign. This success in

[80] Letter from Senior Health Office, Iringa to the Regional Medical Development Officer, Iringa, "Report on the Suspected Case of Smallpox", May 15, 1973 in TNA, 450/HED/130/6: Smallpox Iringa 1964–1973.

[81] TNA, 450/HEL/20/5: Vaccine, 1963–1977, Report on Rufiji District Immunization, November 17, 1967.

[82] Letter from EE Lymo, Officer-in Charge-Smallpox Eradication Unit, Dar es Salaam to the Principal Secretary, Ministry of Health, Dar es Salaam, "Investigation of a Reported Case of Smallpox from Songea," December 23, 1972 in TNA, 450/HED/130/14: Smallpox Ruvuma 1964–1974.

eradicating smallpox hinged on smallpox vaccination, which was facilitated by several factors including international assistance, mass vaccination policy, free distribution of vaccines and associated health services under *ujamaa* policy, public health education, adoption of improved vaccine and technology, and political mobilisation. Despite the success of the campaign, smallpox vaccination in Tanzania faced several challenges, including people's hesitancy on religious grounds, concern over the loss of reproductive fertility, and reliance on traditional medicine. Other obstacles included the lack of refrigerators for storing vaccine lymph, lack of staff, funds, and vehicles, and a lacklustre support from some political leaders within the lower ranks of administration.

This historical investigation into smallpox vaccination builds on a few pioneering historical works in Tanzania that have acknowledged, though in passing, the Tanzanian success story of smallpox vaccination.[83] But this article differs from these works in providing details and evidence of the success. The evidence comes from the recent postcolonial archival documents that have become available to the public following the expiry of the thirty-year rule. Additionally, the study ventured into other new sources, namely newspapers and Tanzanian Parliament Hansards. It also differs from previous works analysing the challenges associated with smallpox vaccination in Tanzania. Most importantly, it has shown that, in the 1970s and 1980s, the government, local communities, and the international community implemented smallpox campaigns that were planned in the 1960s. This finding shows that future-making was not only a national, but also an international endeavour. Indeed, the findings of this study underline the call for non-marginalization of national and local communities in future studies.[84]

Additionally, the investigation of vaccination against a past epidemic has the potential to offer a window through which we could see public health policy, economy, the nature of government, health systems such as facilities and personnel, and the ordinary people's agency as manifested in acceptance, evasion, and even resistance. The study may also offer us

[83] Iliffe, *East African Doctors,* 206; Kilama, Nhonoli, and Makene, "Health Care Delivery," 201-202; Chagula and Tarimo, "Meeting Basic Health Needs," 152.
[84] Detlef Müller-Mahn, "Envisioning African Futures: Development Corridor and Dreamscapes of Modernity," *Geoforum* 115 (2020): 156–159.

lessons that we can draw for controlling the current Covid 19, Mpox, and other future epidemics. The lessons may include learning from past challenges and successes associated with vaccination endeavours. Stakeholders, namely communities, governments, and international institutions such as the WHO may accomplish the initiatives by redressing the challenges, while adopting past successes in the form of best practices. Some of the best practices to learn from smallpox include designing technologies that reduce pain during the administration of vaccines, political mobilization, mass vaccination, health education, and redressing health system problems, socio-economic, and cultural impediments to immunisation.

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