CHAPTER – IV

COLONIAL PUBLIC HEALTH POLICY AND EPIDEMICS

Colonial Public health basic foundation and implementation and health measures adopted to fulfillment of the needs of the military, Europeans and tea garden laborers. The concerned of health by colonial government was integral part of colonial expansion especially military and economic interests in the region. Particularly the British imperial interests driven the military expeditions towards south East Asia and as a consequence the health care in the early expansion period was not of general population. It was still confined to their own military and European community. Gradual expansion and occupation of the province had broken the limited concerned of health particularly the "colonial enclaves" and extended their concerned to the public as they realized 'contagion' was not possible control only providing medical care to Europeans and military. This realization came after 1864 particularly Royal commission recommendation on sanitary conditions of military in British India. And their process and the development of public health in Northeast India can be best understood by examining the particular health measures adopted in times of epidemic diseases.

This chapter explicitly deals with the professional and administrative structure of medical establishment, public health policies to manage different epidemics in Northeast India. It also discusses the nature of implementation of various preventive measures and policies towards control of contagious epidemics diseases.

4.1 Early colonial health and sanitary initiatives 1837 to 1903:

The initial health and sanitary measures of British intended protect the military areas and its surroundings to stop the spread of infectious diseases. Early military establishment which were isolated from the native villages and their surroundings were maintained with clean surroundings, safe water-supply and drainage systems were significant measure. Instead of extending about the sanitary policy, Government isolated themselves from the public was the early health measure adopted by the colonial Government. But that was just the beginning, and because of indifferent attitude, the colonial Government cannot carried out the policy to a great extend in the early stage. However, the sanitation measures adopted followed a positive result for

controlling the spread of diseases among the cantonment. However, till the year 1875 there was no special sanitary commission for Assam.

Moreover, due to few surgeons who can supervise the sanitary arrangement was also one of the reasons. For instance, there was no special supervisor appointed in the department of sanitation. In 1875 deputy Surgeon General of Dacca circle was nominally appointed as a supervisor in the Department of Sanitation for a vast tract of European colony. So, little progress was made in the matters of sanitation. Colonial officials were of the opinion that the progress of sanitation was not possible unless native cannot co-operate with them and that was the reason they employed natives in the Department of Sanitation. Therefore, the Department also employed professional scavengers and sweepers so that further progress can be made in the way of conservancy arrangement in general.[1]But as European officials wished in the sanitary affairs, natives were reluctant to co-operate because of their proverbial apathy and that stands as an obstruction in matters of sanitary reforms among the natives. And also because of widely scattered agricultural population and their habit of cultivation and settlement, sanitary reforms were hard to be developed as anticipated. Thus sanitation was only confined only to the larger centres.[2] So, the places mostly concerned in clearing jungles were in all the neighboring sadder station. Thus, a system of conservancy was introduced in the principal towns and tanks for better drinking purposes.[3] Headquarter stations were given more importance and so does the military lines as for instance in Cachar. Extensions of drainage systems were made in the stations and that measure was extended in the vicinity of Tura stations too.[4] Thus, the early measures adopted were simply towards primary sanitary measures confined to limited extend.

However, there were other measures undertaken successfully under sanitation. The measures include removal of unhealthy locations to healthy sites and thereby clearing of the jungles. In 1837 sickness of various kinds was common among the natives who settled in Gauhati region. But there was no sanitation officials who could help and monitor the sanitary measures. So, colonial Government entrusted civil authorities to initiate the measures. Therefore, under the supervision of civil authority in Gauhati,

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[1] ASA, Administration report of the province of Assam 1875-76,p-145
[2] ASA, Administration report of the province of Assam,1878-79,p-149
[3] ASA, Administration report of the province of Assam 1875-76,p-145
[4] ASA, Administration report of the province of Assam,1878-79,p-149

they cleared jungles, cleared the water tanks in all the stations, and old roads were removed where they found unhealthy and open new roads and bridges in order to obviate the sickness. However, the colonial officials found Gauhati so unhealthy and that was also one of the reasons colonial Government shifted the head quarters from Gauhati to Shillong.[5] Gradually, greater scopes of sanitary reforms were extended for the natives. Thus, with changing of Headquarters from Gauhati to Shillong, native conservancy and artificial water course arrangement were made in Shillong and thereby public latrines were erected too.[6]

The first measure adopted for larger public in the province was in the year 1877 by removing unwholesome *bazaar* at Dibrugarh to a better site and laid out a good plan and arrangement of water supply was made. Colonial Government paid its attention to remove that *Bazaar* because annually cholera epidemic occurred in the areas. However, the market was an important site for tea garden labourers who came to do marketing at that place.[7]Though, annually cholera appeared at Dibrugarh market, compared to the other parts of India, very rare epidemic occurred during social gathering, fair and festival there. But in matters of fairs and festivals, colonial Government were very serious. In 1878 while muhammadan fair were about to held, precautionary measures were taken before the fair began. And because of such measures undertaken, there was no single case reported of an outbreak of cholera[8] from all the above stated measure adopted in the sanitary affairs of the province.

Thus till the year 1889 the sanitary condition of the natives were still poor. For instance on several municipalities, one at Gauhati Government, was passive about to invest money for water supply. And the rivers available in Gauhati were much polluted but that was the only source of water for the town and as a result, the conditions of people living in the vicinity were unhealthy. At Dibrugarh, there was no proper drainage even in the civil and military stations. In Sylhet, there was great difficulty in obtaining good drinking water, and their want was very keenly felt by numerous residents. At Sibsagar, the conservancy arrangement were not satisfactory as they ought to be. At Nowgong, the private latrines were in many instances very

[5] M'Cosh, John, *Topography of Assam,* Sanskaran Prakashak, Delhi, 1837/1975, p-90.
[6]Hunter, W.W, *A Statistical Account of Assam,* B.R Publishing Corporation, Delhi, 1879, p-255
[7]ASA, A administration report of the province of Assam, 1877-78, p-147.
[8] WBSA, Proceedings of the lieutenant Governor of Bengal, Political department, 1878-79,p-2

defective and foul.[9] But colonial Government took none measures to improve the sanitary condition in some of the principal towns and even in military establishment. But in matters of provision of sanitation and drinking water supply, colonial Government made provision many times for coolies in the province. Therefore, in the year 1902, sanitary measures made for the coolie's camp of over 200 strength on the Assam-Bengal Railway, seven were in the districts of Cachar which were favourable. Gradually, for looking after the affairs of sanitation among the Government project area, of Dhubri-Gauhati, extension of Eastern Bengal Railway was placed under the administrative medical charge of the civil Surgeon of Goalpara District, and Government sanctioned the replacement of Bengal by Assam medical staff. [10]

Earlier, sanitary measures was confined to a small portion and sections of population and the scourge of epidemic diseases frequently took many lives at the same time. Sanitary measures alone cannot prevent the spread of the diseases. Furthermore, for the natives, even early sanitary measures were not implemented for them by the colonial Government. But epidemic diseases frequently occurred, and the distributions of diseases were also increasing. By the re-organization of medical administration in the province, various health measures were enacted and enforced for the province. Especially, there were various measures adopted for the prevention and checking of epidemic diseases of cholera, malaria, small-pox and Kala-azar. Before dealing with a particular disease on health measure, first let us briefly outline some of the powers delegated in times of epidemic outbreak in the provinces.

4.2 Epidemic diseases Act 1897:

Epidemic diseases Act of 1897 was the policy of the Government of India. Under the Act, Government of India delegated powers to Local Government in times of an outbreak of infectious or contagious diseases. Below were the delegations of powers in the province of Assam and deals only with cholera, small-pox, malaria and kala-azar epidemic.

Under the act, there was provision for prevention of Cholera outbreak in during times of fairs and festivals. Epidemic diseases Act prohibited the attendance at fairs of persons residing in areas where cholera exists. And in every fair, proper arrangement

[9] ASA, Assam secretariat, Revenue A, June, 1892, No.49-58,p-16
[10] ASA, Annual Sanitary Report of the province of Assam, 1903,p-11

of water supply and special medical inspection were preferred. The principles for guiding the action to be taken for protection against an outbreak of cholera was to avoid large assemblage and provision like proper sanitary arrangement were made in times of such occasion. According to Section 2 of the Act, for the prevention of cholera, powers were delegated to local Government to paid special attention while contacted with food and water, because these were considered as the main source of cholera. And the same were forwarded by the Government of India to the sanitary commission of Eastern Bengal and Assam and also to the Deputy Commissioner of Garo Hills.[11]

The following were the cases relating to that of small-pox outbreak in the region:

Under epidemic diseases Act 1897, Local Government was empowered to frame temporary regulations in case of any serious outbreak of small-pox in any locality. Moreover, there was a supplementation of simultaneously inception of steps to bring the vaccination Act into force in the locality.

As to the legality of all measures taken up to vaccination compulsory, the following are the cases relating to the outbreak of Kala-azar.

Delegation of powers in times of kala-azar epidemic in the province were. In 23rd July 1926 in exercise of the powers conferred by section 2 of the Epidemic Diseases Act 1897 (iii of 1897), the following were the temporary regulations for preventing for the outbreak of kala-azar or the spread in Assam

Part I:

a) In case of kala-azar outbreak in any district or sub-division, local Government was represented by the Director of Public Health or civil surgeon and he was the responsible person to outline the measures.
b) If any person was found suffering from kala-azar in a tract, the district magistrate or sub-divisional magistrate any time, on the advice of the Director of Public Health or Civil Surgeon, issued one or more of the following orders provided that if the person suffering from kala-azar is a child below the age of 14 years, the parents or guardian of the child was required to produced the

[11] ASA, Government of Eastern Benagl and Assam, File No. 138, April, 1906, p-1-3

child for treatment under the sub-clause(a) or to carry out the destruction of the house or its contents or the clothes of the patients under sub-clause(b)”:-

a) That, such persons had to undergo a complete course of curative treatment, either as an out-patient or as an in-patient, at a free hospital.
b) That, the house of such person and all or any of his clothes, and all or any of the contents of his house, was to be destroyed or disinfected
c) That, all or any of the inmates of the house in which such person was resided forthwith reside at a place selected by the said magistrate: provided that compensation was to be paid by the district or sub divisional magistrate from public revenues for all property destroyed or damaged under this regulation. In assessing such compensation the said magistrate, in each case constitute an advisory committee and considered the advice of such committee before giving his award.

Part II:

1) When any district, sub division or other tract had been notified under Part I of these regulations, the local government issued further notification and declared any local area within such tract was “specially notified area” for the purpose of regulations. When any local area had been specially notified under Part II, the notification under Part I shall remain in force in such local area in addition to the notification under Part II.
2) No person or persons in residence within such a specially notified area shall, without the permission of the district magistrate or sub divisional officer, migrate from such area with the purpose of, or with the effect of, ceasing to reside therein.
3) It was the duty of every *goanbura* whose circle lies within a specially notified area
    a) To prepare and maintain a nominal roll of all families and a member of such families with the orders of Government prohibited migration
    b) To report immediately to *mauzadar* if any family or persons migrates, giving the exact address of the place in which the person or persons concerned are believed to be residing.

The *goanbura's* nominal roll was remained in his own possessions, and he be open to Inspection and verification by inspecting officers, including the assistant surgeons and sub assistant surgeon on kala-azar duty, when required.

It was the duty of the *mauzadar* to supervise the maintenance of his nominal roll. On receipt of a report regarding the migration of an infected family the *mauzadar* immediately verify the report and, if correct, notify the district magistrate or sub divisional officer of the infringement of that order.

1) A district magistrate or sub-divisional officer, on the receipt of a report from *mauzadars* showing that any person previously residing within a specially notified area had without permission migrated from such area to any other area within his jurisdiction, any order such persons or persons to return within a specified time to their original residence at their own expenses, or if the place to which these persons had migrated was outside his jurisdiction, he had to inform the magistrate of the district or sub divisional officer concerned, who may thereupon took similar action.
2) In tracts where there were no *goanburas* or *mauzadars* the duties imposed upon the *goanbura* and the *mauzadar* under rules v and vi in respect of a specially notified area was carried out by the collecting member of the *panchayat* and the sub inspector in charge of the police station, respectively.
3) The district magistrate or sub divisional officer forbid with notification of any persons or class of person residing on tea garden to visit any specially notified area.
4) A person who were not resident within a specialties notified area had not took up his residence in such area without the permission of the district magistrate or sub divisional officer.[12]

Epidemic diseases of cholera, malaria, kala-azar and small-pox were a problem of both the natives and for colonial Government. The diseases were severe and the mortality was high in the last part of the nineteenth century and first part of the twentieth century. But we see the health measures of colonial Government till the last part of the nineteenth century. It was not concerned much about the health in general.

[12] G.T Lloyd, Second secretary of the Government of Assam ASA, Assam secretariat proceedings, LSG, PH-A, September, 1926, p-18

The health measures were not justifiable as public health measures. Sanitation, vaccination, hospitals, dispensaries, inspections were all active to serve on times of epidemics. But still then, it was not reached through the maxim of people's needs but to the minimum. Because during the colonial period the structure of the outbreak of diseases were first endemic in the early nineteenth century where European native military expanded and diseases were endemic and the availability of western medicine were also limited. Gradually the diseases travelled and spread to a wider population year after year and it broke the diseases in epidemic form in tea garden, railways and among coolies on their transit to the province and in their neighbouring villages. That time western medical facilities were also expanded more to the European Economic Community's and little extension for the natives. By employing even native sub-assistant surgeon and the health of the natives were handed over to European native doctors. And also increase the number of medical institutions and used these institutions as a home to cure for those infected with epidemic diseases. But due to shortage of Government finance, the medical facilities can only cover to twenty percent of native population. By the end of the nineteenth century epidemic reach its zenith in mortality rate. But till that time for European community diseases were no more harm which means an epidemic were broke among the natives. And colonial Government put not much new measures to look after the spread of epidemic diseases. So, those kind of health measures in Northeast India till the last part of the nineteenth century was not a total public health measures. Because in spite of severe outbreak of diseases among the natives. There were no such total public health measures adopted in the last part of the nineteenth century. And the severity of epidemics diseases was continued till the first part of the twentieth century and colonial Government took serious turn only in the first half of the twentieth century and epidemic diseases Act were also enforced in the province only by the first part of the nineteenth century. Gradually after total public health measures were concerned by appointing special epidemic unit staff and took more serious attention in every aspect to educating the natives on the knowledge on public health with an increase rate of epidemic hospitals and dispensaries gradually it was decline in mortality rate.

So, the above Epidemic Diseases Act of 1897 and powers were also enforced only since the first part of the nineteenth century. In case of cholera, powers was delegated to the province in 1906.[13]

The practical consequences of power under Epidemic Diseases Act of 1897 in the province of Assam were. In order to check the spread of Small-pox vaccination regulations were framed under the Act and renewed the regulations year after year in times of epidemics. Government frames rules regarding the reporting of communicable disease. As, all officers of the revenue and police establishments were responsible for the immediate reporting to the districts or the sub divisional officer of outbreaks of cholera or other epidemics diseases occurring in their charges.[14] Rule 10(vii) and rule 45(ii) of the Assam Land Revenue manual laid down the duties of Mauzadars and goanburas in the matter. Under rule 279 of the Eastern Bengal and Assam police manual, part v, it was the duty of the police to make an early report to the civil surgeon of any out breaks of epidemic diseases.[15]

But in reality when in times of reporting the outbreak of epidemic diseases, there were always delayed in receiving the report from various officers and it was difficult to take measures as soon as possible in times of the outbreak. For instance, in Goalpara, the civil surgeon of Goalpara report on the subject of cholera epidemic in 1922. And the report received was delayed that active preventive measures were out of the question, except anti-choleric inoculations. With no other exceptions, so an urgent medical relief was organized along with "Army corps" doctors, and personnel of 5 sub-assistant surgeons, five subordinate officers were deputed to the Goalpara sub division and three to Dhubri. Sub-assistant surgeons in charge of outlying dispensaries in cholera affected areas were also employed in medical relief within the radius of 4 or 5 miles of their respective charges. In that way the disease was reduced in proportions. But because of no such preventive measures, cholera epidemic broke again and again. In the interior districts *goanbura* were responsible to report the outbreak to the chairman of the local board through the *mauzadar*. The system of reporting was good enough but in times of epidemic Local Board could not sanction an adequate requirement for such outbreak.

[13] ASA, Government of Eastern Benagl and Assam, File No. 138, April, 1906, p-1-3
[14] ASA, Public health A, June 1929, p-1
[15] ASA, Assam secretariat proceedings, Education department, August, 1922, pp-1-6

Moreover, in case of outbreak of epidemic diseases, the police also reported about the outbreak to the civil surgeon. And the civil surgeons undertook the responsibility and distributed cholera medicines as far as possible. Like the police, all officials of the revenue were also responsible and prepared immediate report to the district or sub divisional officer of any outbreak of cholera or other epidemic diseases that occurred within their areas. However, the way of report were found to be not in uniform in nature and revision of the rules by framing new rules for universal application was done time to time. So, special attention was paid on the important matters of improvement and efficiency on health issue of the larger public. Various remedial measures were adopted and the system of reporting the outbreak of epidemic diseases was not ripe until 1922. Gradually, local boards concerned immediate intimation of any outbreaks which comes to their notice. An eventually be able to organized an efficient system suited to the conditions of their districts.[16]

In matters of vaccination it was till 1924 very little vaccine operated except in tea gardens in spite of frequent occurrences of small-pox. So, Government introduced two more epidemic unit in 1925 inoculation was able to extend in a large scale. Gradually, when people realized and appreciated the efficacy of vaccination for protection against small-pox, immediately it was supplied with the quantities of the vaccine as it was required to the civil surgeons and Assistant Director of Public Health for vaccination. But due to deplorable shortage of fully trained personnel in the two epidemic Units, works of vaccination failed to meet the needs of the whole province.[17]

Thus there were various rules issued for checking the spread and outbreak of epidemic diseases. But in spite of Government efforts in some sense the condition of public health was not much improving as anticipated. Innovative and new measures were thus adopted. Different to the other measure in 1925, Government organized public health propaganda amongst the general public and in schools. The propaganda was delivered by special kala-azar assistant surgeons during their tours in the districts about the prevalent epidemic diseases of malaria, kala-azar, cholera and small-pox and explained with much interest to the public in order to make them aware. It was being demonstrated with pamphlets and leaflets and was later distributed to the

[16] ASA, Assam secretariat proceedings, Education department, August, 1922, pp-1-6
[17] ASA, APHR,P-10

public. These leaflets were translated in Bengali and Assamese in order to make them understandable to the general public. From then onwards, the Director of Public Health in Assam supplied annually with a thousand copies of illustrated pamphlets in Bengali and Assamese and distributed among students in schools. In that matters, local boards heartily co-operates in the scheme.[18]And that had far reaching consequences and people become aware of those infectious diseases.

However, the Public Health administration in the province was found defective till 1931 because, in spite of frequent occurrences of epidemics, preventive action was not much taken. An increase number of special assistant surgeons were entertained for curative measures. Out of 100 surgeons 85 were entertained for kala-azar treatments. And in case of malaria, Public Health department took the charge for control of malaria. But due to poor management of public health department, there was an unorganized setting in the department. No separate preventive and curative administration, no separate staff to carry out effective propaganda for the diffusion of ideas of hygiene and sanitation among the rural people and the outcome of Public Health work was so inadequate.[19]

Epidemic diseases of nineteenth and twentieth century's had thus shape and evolved out Public Health Implementation in the province. There was various health measure implemented in the province in times of epidemics. The following deal with kala-azar and public health.

4.3 Preventive and curative measures of kala-azar:

Kala-azar, the disease of black fever that raged the lives of many in the province of Assam, was one of the colonial Governments concerned. But unlike the other epidemic diseases, the very disease called kala-azar was taking a longtime for proper identification of the disease and treatment. It was widespread since 1880s but due to its difficulty in identifying the nature, cause and origin of the disease, effective and preventive and curative measures was lately made. After the wider spread of the disease Governor General in Council deputed Surgeon G.M.J Giles in 1889. He was a Civil Surgeon, Hongshangabad. The Governor General felt the need to enquire the disease that spread in Assam. So, under the orders of the Chief Commissioner and the

[18] ASA, APHR, 1925,PP-17-18
[19] ASA, Medical Department, Public health B. S eptember 1932, p-1,3, 6

Deputy-Surgeon-General, Assam district, he conducted a full enquiry in the prevailing disease and has drawn a salary of Rs.700 per month. He dedicated himself in finding the cause and origin of the disease in the region. Kala-azar cases were closely examined at Gauhati and made a number of experiments. And from his findings it was certain that kala-azar was communicable through human intercourse.[20]

So, various precautionary measures were taken for checking the spread of kala-azar. For the first instance, intercourse between the bordering villages of Golaghat and Nowgong was checked. Quarantine measures were made in Kaziranga, and also at Nigriting steamghat, where they thought communicable possible with the disease through human intercourse. And the *Mauzadars* and *Tahsildars*, were given responsibility to gathered information whether any person arrived in their sub-division were infected or not. But they were unable to fulfill their duties on recognizing those infected who were immigrated to Nowgong nor recognized by the authorities or anybody. But in real case, from various reports eight migrated families into Nowgong in the year 1898 were family of four ex-gardens coolies at Bokakhat came from an infected place, and on their way to Nowgong two members were died. So, the responsibilities on *Mauzadars* were not successful to prevent other villages to make them aware and isolated themselves from those infected persons. But it was considerable for their failing on recognizing those infected families as they were lay men and for gathering that information they were dependent on *goanburas* and all were lay men alike. Out of hundred ninety-nine they were all illiterate and ignorant. And of all the goanburas only one person was able to read and write. Such kinds of persons were thus unable to detect kala-azar cases, unless pronounced. So, some pamphlets of Dr. Rogers were sent to the *tahsildars* and *mauzadars* for distribution to the sub-divisional officer of Golaghat. But the pamphlets were also not used as it was prepared. For instance, the *mauzadars* of the Namdayong was given three pamphlets for distribution, and he gave one to the eldest son of the *goanburas* of mahmaki, who was the only literate person. And the youngman read the book for three days and then kept it. But could not memorized what he read that indicated he had neither the capacity for grasping the points dealt with in the pamphlet, nor interested in explaining them to the people. The other pamphlet was handed to the mandal at ganakpukri. And that was much worse than the previous case because the mandal did

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[20] ASA, Assam secretariat Proceedings, Home A,July 1890,p-8

not pay attention of the pamphlet and blame it was because of his personal pressure of work he was unable to see. Even the mauzadar had done nothing on the matter. So, the purpose and distribution of pamphlets served no useful. So, in order to assist the mandals Government appoint itinerating hospital assistant for giving direction to the mauzadars, tahsildars, goanburas. Besides, detecting the cases in the villages, itinerating hospital assistant helped the mandal and made them explain to the villagers, about the nature of the disease, by examining the travelers from the Nowgong. Segregation policy was adopted as far as possible where regular charitable dispensary was not possible to run. And where populations were large population charitable dispensaries were opened and gave medical relief to the sick.[21]

But the dispensary service alone cannot eradicate kala-azar, but can only mitigate the conditions of suffers, and, in some cases only effect cure. Likewise, in most of the divisions the factors or measures adopted for kala-azar were not of practical value in general. In some case it was too late to attempt and check the course of the disease by segregation and isolation alone because the sickness had spread over too wide area

It was until the year 1918 operation against kala-azar was unevenly effective. By the year 1919-1920 absorbed the main energies of the public health department in the province. With the discovery of effective treatment for it by then the efforts of the department had directed mainly to perfecting the organization for discovering cases and bringing them under the treatment. [22]By the year 1920 the death rate was perceptible improved. In most of the tea gardens preventable measures were strongly put according to the availability of money. Conditions differ on the various gardens and probably no specific system that was found suitable to them all. [23]

Under the Epidemic Disease Act, in times of kala-azar, power was delegated to Local Government. So, local board and the municipals maintained hospitals, dispensaries and medical assistance to the inhabitants within their jurisdiction during the prevalence of the disease. And the Government felt the responsibility should not be rested only to particular department. So, they assigned the works to the local officers, the deputy commissioner, the local boards and municipalities and of the civil surgeon because it was found impossible to look after by only one department of the entire

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[21] ASA, Home A, june 1899, no.138-148,pp-3-14
[22] NML, The kala-azar position in Assam, Indian medical Gazette, September, 1922, p-389
[23] ASA, Assam secretariat proceedings, Education department, Public health A, April 1922,p-2

responsibility including campaign. Moreover, without the co-operation of the local people as it was found impossible to reach to a greater mass an allowance were granted to sub-assistant surgeons with no objection to a small sum were paid to the engineering staff and erected kala-azar buildings. [24]Eight assistant surgeons and 35 sub-assistant surgeons were employed on special kala-azar duty in the province and provided 382 in patients in kala-azar hospitals and wards in 1922. There were 23 special kala-azar dispensaries and many district dispensaries were all equipped and dealt with the disease successfully. 15,880 patients were treated for kala-azar in 1921 and the new organization to carry out kala-azar led to improve the health of the people. And in the hill, preventive measures were taken where men infected with kala-azar were usually cast out of from his village and the infected houses and site were burnt down. But the same measure was not possible to put into practice in the plains. With the gradual increase of kala-azar hospital, patients started seeking admission to hospitals and get treated. For instance in North Cachar hills the outbreak appeared almost extinguished as a result of such measures. By practicing that kind of practice they had reached their maxim effort, and that resulted and cause decreases in mortality. But that kind of practice was not possible to be adopted in all the case. As for example in the plains they cannot shift their house with the same facility and the compulsory removal of people from infected areas was limited, because the funds available for the purpose was also limited for the plains where large number of houses there. And after the discovery for the treatment of kala-azar antimony tart rate. Those attended dispensaries and hospitals were treated with great success. Voluntarily and cheerfully they undergo treatment and vigorous campaign and policy in educating the public in medical hygienic matters was highly marked to bring a great success.[25]

Facilities for the treatment were provided practically in every area where it was required gradually as far as possible. Civil surgeons were placed more directly in charge of the operations in their districts. The policy of encouraging provision for treatment in local board dispensaries had extended. Later, co-operation between medical and sanitary efforts did produce fruitful results. Finances were also granted more to activate the better policy. However, on the line of investigation of the disease, it was not filled with satisfaction. Even there were inadequate measures adopted for

[24] Ibid,p-3
[25] NML, The kala-azar position in Assam, Indian medical Gazette, September, 1922, p-344

the prevention of the disease. Without knowing the accurate carriage of the disease, it was not possible to adopt accurate measures. So, the Government put more efforts to solved kala-azar epidemics in the province. Sanitary Inspector (Health Officer) was posted in each of the municipalities in Habiganj, Sunamganj and Sibsagar in 1922. Other officers were also posted in Gauhati, Dibrugarh, Sylhet and Habiganj under the jurisdiction of the boards provide with the services of one trained health officer, and enabled to work out for the promotion of public health. [26]

Gradually, colonial Government maintained efficient administration on its campaign against kala-azar. Thus form the board consisting of the Inspector General of civil hospitals and the Director of public health obtained co-ordination between the medical and public health department. The board consists of Inspector General of civil hospitals and the Director of Public Health and meets on monthly basis where both members always present themselves at head quarters and goes thoroughly the districts reports on the progress of the kala-azar campaign. The board advised Government on all questions relating to the execution of the campaign, including proposed additions to personnel and increase in expenditure. Issued necessary instructions to civil surgeons regarding the execution of the campaign in their districts and advised them in any difficulties or complications that arise in that connection. The Director of public health was acting under the authority of the board and was the Chief Inspecting Officer of operations in all districts. Any defects noted by him were considered by the board and passed such orders as it considered necessary for remedy. And for the efficient administration of the campaign civil surgeons hold the responsibility to control and supervised, inspected the cases of all kala-azar operations in their districts, and of all personnel engaged in operations of kala-azar belonged to the medical or the public health department. The creation and organization of new engagement in war with kala-azar bore fruitful result. And the organization of campaign was thus the one purposeful and successful campaign against that disease was concerned. Compulsory treatment were also enacted and enforced in all the districts. Throughout the infected districts, treatment of kala-azar cases in special kala-azar dispensaries and out centers and in local board dispensaries were greatly encouraged. Frequent inspection and the progress of work on the lines were also laid down in the departmental pamphlet. More attention was given to the outdoor work in

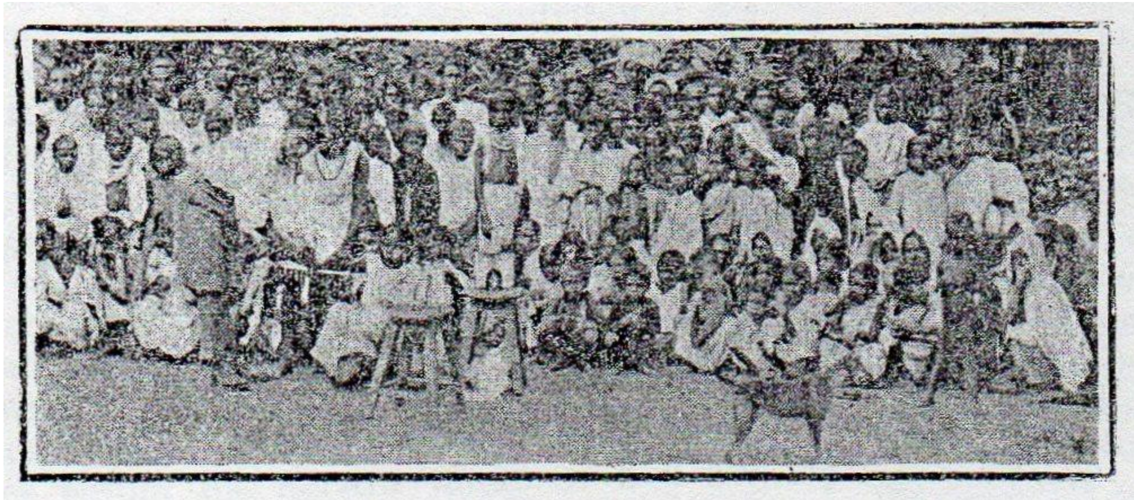
[26] NML, The kala-azar position in Assam, Indian medical Gazette, September, 1922, p-390

the infected villages areas where sub -assistant surgeons were in charge. The village kala-azar registers was also inspected and the civil were kept up to date and sub-assistant surgeons were also paid frequent personal inspection by the civil surgeon.

There were two special kala-azar sub-assistant surgeons working in Garo hills under Government medical servants during 1823. One Bengali at Tura who was in charge of the special kala-azar ward and one in the interior, a Garo, named Dalu. In Goalpara Mr. Munward, civil surgeon of the districts, had taken great interests in connection with kala-azar and had given much personal attention to it. And the disease was also endemic in the south bank of the river, and survey work was conducted in the Bijni Estate and appointed one more kala-azar sub-assistant surgeon and was subsequently posted for the district at Dhupdhara towards the Kamrup border. In Kamrup, there were four special kala-azar sub assistant surgeons who work in epidemics area on the south bank of the river and there was one who worked at Saulkusi on the north bank of the river. In Nowgong district, there were already ten special sub-assistants. Three more centers were opened at Lanka, Natuagaon and Mayang. And for survey, two more were employed, one in the chapari Mauzas and the other round singmari and in the mikir hills.[27] Of all the districts, most excellent work carried out by the kala-azar survey staff in Assam was found at Nowgong. It was the kind of field work which was by degrees bringing the disease under control and attracts the patients for treatment, but the numbers under treatment were relatively few as compared with those reached by village to village propaganda.

[27] ASA, Assam secretariat proceedings, Education department, Public health A, September 1923, p-1-4

Figure:1 Kala-azar campaign in Nowgong.



Source. An account of Mr.LD Mukherjee, assistant directos of The Times of Assam. From Indian Medical Gazette, February 1924,p-95[28]

But in spite of Government great efforts, it was felt that, extra staff to be recruited in the region. Because in those past years kala-azar had took huge toll of human life and no civilized Government can disregard as such human sufferings. Likewise, the Government also put efforts for saving lives before the discovery of medicine that can cure kala-azar. Fortunately, after the discovery of the disease and the cure for the disease known to them, Colonial Government spends large sums of money to stop that awful wastage of human life and there was no doubt that they had saved thousands from a long and painful illness followed by certain death. It was much a credit side. So, the government extends an effort to those who were afflicted and reduce the incidence of the diseases by ordinary measures with their medical staff. But it was readily admitted that government progress had been slow. Thousands were cured but at the same time more were falling victims to the disease. The reason for that was due to heavy expenditure and the Government found very difficult to give provision in all for the effective and efficient administration. Research work was also proceeding in the laboratory of the Pasteur Institute and similar laboratories for acquiring the knowledge to dealt with the disease. Major Shortt was appointed by the Government to carry out such research work in the province of Assam. Money for the research was drawn from the Indian Research Fund association allotted a grant of Rs.15, 200 for the enquiry for the lines and was determined by an Assam Research Committee,

[28] Mr. LD Mukherjee, assistant directors of The Times of Assam. From Indian Medical Gazette, February 1924,p-95

consisting of public health and the director of the Pasteur Institute. Such kind of works was carried out by individual medical men and each work independently. The co-ordination with the scheme thus introduced a great value. And there was increase in number of 21 special kala-azar sub-assistant surgeons in the year 1923. Government paid each sub assistant surgeon Rs.90 a month.[29]

The following were the number and names of sub assistant surgeons for treatment of special case of kala-azar.

Table 12: Number of sub-assistant surgeon for special kala-azar treatment 1923

District	Existing dispensaries where sub-assistant surgeons are already posted	New dispensaries where sub-assistant surgeons are to be posted	Total No.
Sylhet	1. Habiganj kala-azar ward 2. Shaldega kala-azar hospital 3. Shamsher nagar 4. Betkandi 5. Shatiajuri 6. Itkho;a kala-azar dispensary 7. Sarkar bazaar 8. Chhagli bazaar 9. Putijuri 10. Chhatianin 11. Paschimbhag 12. Singerkatch 13. Murakari 14. Shahajibazar 15. Sughar 16. Mantala kachar 17. Durgapur 18. Kaliganj 19. Chorea bazaar	1. Niamatpur kala-azar dispensary 2. Duarabazar 3. Dasghar 4. Baldi 5. Bansibari 6. Baruna 7. Satgaon	28

[29] ASA, Assam secretariat proceedings, Education department, Public health A, September 1923, p-6, 20

	20. Akhalia 21. Kathair		
Garo Hills	1. Tura kala-azar hospitals 2. Garobada kala-azar dispensary	1. One kala-azar duty in the interior of the Garo hills	3
Goalpara	1. Gouripur kala-azar hospital 2. Goalpara 3. Dolgoma kala-azar dispensay 4. Dudnai kala-azar hospital (for indoor work) 5. Dudnai (for out-door work) dhupdhar kala-azaar dispensary 6. Rangjuli	1. For survey duty	7
Kamrup	1. Maniarytinsake 2. Rampur 3. Chhoygoan 4. Ajhara 5. Asualkuchi	1. Duarkuchi 2. Survey duty	7
Nowgong	1. panigaon 2. puranigudam 3. kathiatoli 4. chapanalla 5. jamunamukh 6. dharamtul 7. doboka 8. samaguri jajari 9. jamguri, kalonigaon and pakhimoria	1. Natuagoan 2. Lanka 3. Mayang 4. For survey duty	13
Darrang	1. bengbari 2. goraimari 3. tangla 4. kharupatiachamuapara	1. Rangamati 2. Survey duty	6

Sibsagar	1. nazira 2. namtiali 3. charingia 4. nabarani	1. Golaghat 2. Chungi	6
Khasi & Jaintia hills	…………..	1. Mathan	1
Total	**51**	**20**	**71**

Source: Lieutenant –Colonel T.C Combie Young, Director of Public health and secretary, Public health board Assam, 30th July 1923, Public Health A, p-22

Also in Lushai Hills, one more Lushai Doctor was appointed and served as special kala-azar duty.[30]The campaign against kala-azar was thus greatly strengthened with the close co-operation between Public Health and Medical Department since 1923. As a result, much greater prevalence of the disease had been discovered than was formerly believed and every endeavor was made to bring the sufferers to the nearest centres at once for treatment. In all the infected areas, dispensaries were equipped to treat kala-azar cases. Injections were carried out two days in a week and when necessary dispensaries open sub-centre's where injections were given two more days in the week. Through surveys careful records were kept. There was difficulty with regard to the treatment of the course because it covers a lengthy period of about three months and patients were kept to become tired of it, and when they feel better they discontinue treatment before a complete cure was affected. Special regulations were enforced, compulsory attendant were framed to meet the cases. For that six special kala-azar assistant surgeons were employed in the more heavily infected districts of Sylhet, Goalpara, Kamrup, Nowgong, Darrang and Subsagar to assist civil surgeons. In addition to the ordinary medical department, sub-assistant surgeon and local board doctors, 79 special sub-assistant surgeons were employed.[31]Special kala-azar hospitals were opened in heavily infected areas. The number of hospitals and dispensaries with their out centres treating kala-azar in the province in 1923 were as follows:

[30] ASA, Medical B, Progs, September 1932, No.365-374,17
[31] [31] ASA,APHR,1923,P-13

Table 13: Numbers of hospitals and dispensaries in 1923

Special kala-azar hospitals	14
Special Kala-azar out-centres	7
Special kala-azar dispensaries	90
Special kala-azar dispensaries out-centres	128
Local board and other dispensaries	116
Local board and other out-centres	60
Total	415

During the year 1923, there were four hundred fifteen hospitals and dispensaries where kala-azar was treated. Regarding the medicine and treatment of the disease in Assam with Tartar Emetic began in 1919, where only a comparative small number of cases were treated. It was soon realized that the drug was not that effective and as a result, it was soon replaced by Sodium Antimony Tartrate which was found much safer and gave much more satisfactory results. Although the treatment with newly introduced Drug was very successful, still it had the treatment disadvantage of being long and tedious. But the treatment was difficult to be enforced in patients who were completely incapacitated by the disease, and improve considerably after a few injections and discontinue treatment altogether or attend very irregularly. That irregularity had made it very difficult to affect complete cured of the disease. In spite of the regulation in force under the Epidemic Diseases Act compelled patients to undergo a complete course of treatment. Campaign against the disease was thus greatly handicapped by the large number of patients who stopped treatment. Much propaganda work was being done by means of Lantern demonstrations and illustrated posters and pamphlets on the disease, emphasizing the grave danger of stopping treatment.

Moreover, careful and detailed experiments had been carried out with these drugs in the kala-azar research ward attached to the Pasteur Institute and Medical Research Institute Shillong. These researches were of the greatest assistance in helping the campaign against the disease. In 1924 one of the drugs was replaced by Sodium Antimony Tartrate, but due to financial shortage that was not possible to make available in a large scale. In 1925 there was a reduction in the prices of the drugs due

to competition and the Government of Assam decided to carry out treatment with Urea Stibamine (*Brahmachari)* as an experimental measures. The results achieved was found satisfactory and encouraging and the surveys that was strenuously carried out in the villages revealed the fact that fewer cases were discovered in the earlier stages of the disease and that indicated kala-azar was brought more and more under control.[32]

The working of the regulation of kala-azar was that orders were not carried out at their knowledge regarding the transmission of infection. But repeatedly submit the lists of the natives who had done half treatment of kala-azar and they hoped to convinced the natives to undergo full treatment of the course of kala-azar. Actions were taken by administrative officers for that matter and compiled the list of those names. Further, in most cases that ceased to attend for treatment were also improved so much and imagine themselves as being already cured. Further propaganda regarding the insidious nature of the disease and the length of the time requisite for cure were carried out in the infected villages. Through printed materials distributed by accredited agencies and accompanied instructions to the mauzadars and then to the goanburas and to the villagers. Few districts possess in-door accommodation for treatment but all were not possible to force into hospitals.[33]

The director of kala-azar commission of Gauhati said that a very limited number of cases were experimented in the year 1928. In this regard, Dr, Napier considered Amino-stiburnea as effeceint as urea stibamine amd in some cases it was superior to it. Certain civil surgeons were also experimenting with the drugs at head quarters and sub divisional head quarters. The drug was administered very much on the same lines as Urea stibamine practically with same dosage. So they used Amino-Stiburea much more extensively in the province. Dr. Silva reported on a series of cases of kala-azar treatment by aminostiburea at kala-azar commission. Almost all the patients who had completed the full course of treatment were apparently completely cured. [34]Thus under such efforts made by the Government, mortality rate from kala-azar had reduced only after the 19030s. The other colonial policy to deal in times of small-pox was vaccination and the following deals with it.

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[32] ASA, APHR,1925,P-16

[33] G.T Lloyd, Second secretary of the Government of Assam ASA, Assam secretariat proceedings, LSG, PH-A,September, 1926, p-18

[34] ASA, LSG, Medical branch, B.Progs, March 1929, p-24

4.4 Small-pox and Vaccination:

After a gradual outbreak of epidemic diseases Vaccination was felt to be needed and gradually they practiced in all the division in the province of Northeast Frontier except one in Dacca. In 1854 there was diminution and owed to withdraw vaccination from all stations where there were not dispensaries or charitable hospitals. There were only three vaccinators attached in the frontier and vaccinated in the places of Gauhati, Chittagong, Cherra, Dibrugarh, Nowgong, Sibsagar and Tezpur. Under the superintendent of vil assistant surgeon. It was in 1860 number of vaccinators were increased into eight. [35] To the other part of the frontier in 1870s in Khasis hills vaccination was introduced but with little success.[36]

Vaccination in the province were carried in the province by the vaccinators specially maintained by grants from provincial funds, by vaccinators entertained by municipalities and by inoculators who were permitted under the supervision of the medical authorities to practice vaccination. These inoculators were paid by those whom they operate. The total number of vaccinator's employed during the season of 1874-75 was seventy three. And the total number of vaccinators employed during 1875-76 was 68 of whom 51 were inoculators.[37]

While in some other places as in Rngamati in the year 1878-79 due to lack of funds vaccination was not carried out.[38]The number of vaccinators increased to 95 of whom 79 were employed in the Kamrup district of these 78 were trained ex-inoculators, who earn a livelihood without any assistance from the Government by charging a small fee for each operation.[39]

In 1888 In Sylhet ten Government vaccinators operated 937 cases. They move into the interior of the districts where there were more opposition and a worse field. The following shows the work done in the district.

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[35] WBSA, Proceedings of the lieytenant Governor of Bengal, general department, 1862p-5-31
[36] Hunter, W.W, *A Statistical Account of Assam,* B.R Publishing Corporation, Delhi, 1879, p-253
[37] Annual Administration report of the province of Assam 1874-75,p-145
[38] WBSA, Proceedings of the lieytenant Governor of Bengal, Politica department, 1878-79,p-2
[39] ASA, Administration report of the province of Assam, 1878-79, p-150

Table 14: Table number of birth vaccinated and successful in 1888

Year	Births	Vaccinated	Successful
1880-81		1,033	773
1881-82		1,945	1,582
1882-83	32,368	16,141	14,874
1883-84	47,740	22,993	22,068
1884-85	36,795	18,818	18,341
1885-86	52,780	24,917	23,529
1886-87	54,729	27,951	26,711
1887-88	62,161	26,734	25,442

Source: ASA, Home A,October 1891, No.130-166,p-24

Vaccination in the province was performed under the direction of Civil surgeon by the dispensary establishment, there being no special organization for that purpose, such as existed in most of the other province in India. The practice of inoculation was general in all parts of the province. Under such circumstances, where vaccinationis was obtainable and was extended.[40]

In case of vaccination Cachar was treated as a part of Sylhet, differing from that district only in the larger proportion of immigrants, to whom compulsory action was properly and easily applied, and on the other hand, of semi-civilized hill men, who had left to their own devices. But inoculation was not much practice in Goalpara districts and in order to put a final check on the practice of inoculation the Deputy Commissioner of Goalpara thought that it would be a good thing to extend inoculation. In Sibsagar it was necessary to introduce any special Act for the purpose of making inoculation a penal offence. In Lakhimpur there was a general impression that inoculation was prohibited. There was little small-pox in the districts and the population was also fairly well protected. In town they vaccination was done at the cost of municipality, in the interior staff of Local Board vaccinators were sufficed where indigenous population was small, and the garden were compelled to do their own vaccination. . In the Khasi hills districts majority of the people were still in favour of inoculation, chiefly because all change were strongly opposed. But their faces of 50 percent of the population were heavily pitted with pock marks, but still

[40] ASA, Administration report of the province of Assam, 1877-78, p-147

facial beauty was not their opinion in any way affected. The Syiems always raised excuses. When asked to interfere with inoculators. They said that from time immemorial it had been the custom to protect the person from small-pox and their subjects decline to listen to their advice. The only plan possible to penalize inoculation was through legislation. The inoculators were the residents of the plains district of the foot hills, and under their prohibiting them to practice inoculation in their district without a license or permit from the Deputy Commissioner was all that required. . In Garo Hills there was no need for compulsory enforcement of the Act in the interior of the district. There were places on the plains borders in which the extension of the Act to the Garo Hills districts, to cause any sort of dissatisfaction among the Inhabitants but on the contrary facilities in many Instances the progress of vaccination. So, no difficulty was encountered on the sides of the Garos. In Nowgong there was no valid objection to inoculations being entirely prohibited by Law in the district. There were but little difficulty found in large substituting vaccination for inoculation but doubtless they were still who preferred inoculation and was done. There were a number of inoculators, but several of those were trained as vaccinators and engaged as such and others were ceased to carry it on. . In the Naga Hills inoculation was known to the in the hill portion of the district, but was practiced by ganaks from Assam in Barpathar and other plains villages but he practice was not prevailed in the hills and the extension of the prohibition of the whole district was unobjectionable. In Kamrup inoculation was largely practiced in the district. And attempt to vaccinate met with much opposition, probable more than in Sylhet, where the attitude of the inhabitants was one of the apathy rather than of active hostility. In many villages and especially in the towns of the Barpeta, no vaccination was ever done owing to the opposition offered by the people, notably of the *Mahapurushyas* sect. and the followers of this sect reject vaccination because it was claimed as contrary to their religion.

The question of inoculation penalizing in selected areas and where penalized vaccination was made compulsory. Act iv of 1865(B.C) and prohibits the practice of inoculation was enforced in Assam. As regards vaccination Act, xiii of 1880 the law on the subject in Assam but that Act supplied not only to those towns and it was also

extended to the province Act v of 1880(B.C) and applied to any selected area wherever situated and could be extended with Act iv of 1865(B.C).[41]

So, Vaccination Act xiii of 1880 was extended to all the first class municipalities in Assam in Gauhati, Sylhet and Dibrugarh, and to Dhubri and Goalpara in the year 1897 it was extended to the second class municipality in Nowgong.[42]

In the year 1923 in Nowgong two special vaccinators in addition to the permanent vaccinators had been entertained. They were sent to the infected villages because small-pox was prevalent in a sporadic form. Those reports were again sent to the Deputy Commissioner for necessary action. But the difficulties were that there was no compulsory vaccination in the rural area thus effective action was not possible. Another difficulty was that in order to prevent small-pox with those cases mixed with other people before they were free of the scabs. Those cases were prosecuted and information was sent to some of the sub-assistant surgeon for report and they found any such instances. But the prosecutions of such persons were not possible unless the villagers themselves did not report. Even the weekly figures of deaths does not always actually represent the numbers of deaths in that particular week, as there was delayed in receiving those reports from the mauzadars. So the reported figure in Deputy Commissioner were sometimes include the number of deaths of some previous weeks, also which were not included in the wires of those weeks on the account of the delay in receiving reports from the mauzadars. So, those figures in Deputy Commissioner represents the number of deaths in isolated villages here and there and not in any particular locality. It was found not necessary to make vaccination in rural areas compulsory. Because in some areas they made compulsory especially in the case of Baniachang but was not successful. The Deputy Commissioners of the hills districts were also not in favour of compulsory vaccination. They were not in favour of extending the compulsory area as they were satisfied with the power they already had when in times of epidemic arisen. The civil surgeon of Syllhet and Cachar were also inclined not to agree with the vaccination Act in rural areas. Because they considered if any action were taken was under the epidemic diseases Act. The two plains deputy commissioner opposed the introduction of rules under the epidemic diseases act unless the emergency was unusually serious.

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[41] [41] ASA, Assam secretariat proceedings, Hme A,October, 1891,p-1-6
[42] ASA, Home A , April 1897, No.77-87, p-2-5

The reason why vaccination was not made compulsory in rural areas because it demand a better staff paid and supervisor and that was mean for them to considered extra recurring expenditure and also because of opposition of vaccination by the natives. But in reality vaccination was carried on and was beyond criticism. The staffs were also given adequate return for the money spends on it. Therefore, they found unnecessary to make compulsion in rural areas permanent or to entertain a more expensive staff at ordinary times. In dealing with outbreaks when epidemic occurred, the Epidemic Diseases Act most natural provision method was entertainment of a special staff to be retained only as long as the emergency lasted.[43] But Sub divisional officer was of the opinion that when epidemic had actually broke out. There were no other alternatives than to make vaccination compulsory by framing rules under the Infectious Diseases Act, if anything was done in the way of abating or checking the outbreak. No time was wasted in order to apply the provisions of the vaccination act, which need only an interval of six weeks before it can be brought into force. In 19th march 1924 the Commissioners obtained the advice of district officers, civil surgeons and the local bodies. There was a conflict of opinions and after careful considerations of the whole questions the governor and his ministers had decided not to introduce the act or any section of the act generally throughout the province. They were willing to extend the Act to any areas under village authorities where recommended and they further prepared to issue rules under Epidemic Diseases Act making vaccination compulsory in any area where an epidemic occur or was imminent, where the course was advocated.[44]

Vaccination and re-vaccinations were being carried on as energetically but the epidemic had not yet subsided. All the mauzas reporting small-pox where there had been opposition to vaccination had been notified as small-pox in rural areas. In those localities the special regulations which had been framed under the Epidemic Disease Act make vaccination compulsory had been forced. Notification of the Epidemic Unit had been sent to push on vaccination systematically. In the Sibsagar sub division area where vaccination was badly affected. Unscrupulous opposition on the part of the local people generally to vaccination and their habit of secret on superstitious grounds continued to maintain foci of infection. That was the fact that as soon as infection dies

[43] ASA, Local self government department, Public health A, September, 1924,pp-1-16
[44] ASA, Local self government department, Public health A, September, 1924,pp-1-16

out in one place it repeated in another. Under that circumstance the difficulty of completely eradicating a disease from the district was made much more difficult. In the Kamrup district there was much opposition, but vaccination and revaccination were being pushed on as much as possible in spite of difficulties. All municipal board other than shillong, Gauhati, Dhubri and Tezpur were provided with well equipped isolation hospitals for segregation of patients.[45]

In the districts of Goalpara large number of people began to resort for the purpose of receiving treatment and that was objectionable. The municipality had their own shed and arrangement for the treatment of the small-pox cases like cholera shed. The chairman of local board and the assistant surgeon objected to be taken to the hospital but the chairman of the municipality did not hear it. The municipality had their own cholera sheds. But they did not have small-pox sheds. In Dhubri municipality they had their places of treatment for cholera and small-pox cases outside the town, and maintained their own staff for the treatment and dieting of the cases. So the same was preferred to Goalpara municipality. Because if the patients were not re-vaccinated they exposed to Infection again. . In Bijni Raj Wards' estate and the sub assistant at Krishna about prevalence of small-pox in the locality, but was told that there were sporadic cases in the villages and vaccination was done and there was difficulty in re-vaccination again. So they collected from the police of the village infected with small-pox. It was found that one assistant sub inspector of police Muhammand Saffar Rahman and his wife and two others officers and three constables were not receiving any re-vaccination. The vaccinators were disinclined. And in the villages of Thekasaur re-vaccination had been done to some extent. [46]

In the year 1928 the Director of Public Health ensured the service of vaccination staff and re-organized. In order to make them thoroughly efficient service and the duties which they called on to perform. So, permanent and temporary inspectors of vaccination were both employed. The departments undergo a course of instruction in English of five months duration commencing on 1st May 1928 in Hygiene vaccination and general sanitation at Berry-White Medical School. Those who were qualified and qualified in the examination were only given the designation that they hold for those who were already employed and were appointed as rural sanitary inspectors with

[45] ASA, APHR,1926,P-11
[46] ASA, LSG, PH-A, December 1927, p-2

increase in salary. Thus sub inspector of vaccination under the Public Health Department of Assam was first appointed as a temporary under Director of Public Health's order. Their main intention was that unlike the temporary establishment of kala-azar branch pertaining to an experimental department, the re-organization of vaccination permanently long established vaccination Department. [47]

In 1923 the highest mortality from small-pox in the district was Nowgong. The civil surgeon reported that the mortality of small-pox was increased since 1921. So, two special vaccinator were appointed by the Local Boards in 1921 in the affected area. They make compulsory vaccination but was not found satisfactory in some area under certain village authorities which it had been extended. In Kamrup the disease was reported from different rural circles and step were once taken to vaccinate and re-vaccinate the people of the affected areas. Where opposition were raised, with the help of Deputy Commissioner some of the people who opposed vaccination were subsequently vaccinated. In the absence of compulsory vaccination all possible measures were taken to combat the disease. And in some areas where epidemic occurred compulsory vaccination was made.[48] Unlike kala-azar small-pox was small in mortality rate and the policy of Government vaccination led into extension of compulsory vaccination in times of necessity had thus prove successful in the long run. The following deal with cholera and colonial health policy.

4.5 Cholera and health policy:

Medical establishment for the prevention of cholera in times of epidemic in the first half of the nineteenth century were for the interior tea district. Cholera camp had been established in Dibrugarh.[49]And at Gauhati hospital was built with well raised kutcha materials. For one station native doctor were made available and given charge of the camp. Debarkation depot of Darrang was selected at Tezpur was selected for the site of cholera camp and was near the steamer ghat, which was approachable and without the labour having to go near the station. Charitable dispensaries native doctor were made available for cholera camp. Civil surgeons of tea garden observed the necessity to employed more native doctor were needed to employ because cholera invariably occurred on every passenger steamer arriving at Dibrugarh between November and

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[47] ASA, Govt of EBenggal and Assam, Medical 1905, No.17-18, p-55
[48] ASA, APHR,1922,P-9
[49] ASA, Government of Bengal paper1872 -15, File No.139/249

May. So, native doctor were permanently established at the cholera camp. Additional provisions for erection of cholera huts were made for labourers where necessary.[50] For an instance, cholera hospital at Gauhati was situated two and half miles below the dry season, where temporary arrangements were made for cholera stricken coolies. The place was known as Bharalamukh cholera hospital maintained by Inland Labour transport Fund or from the authority of tea planters.[51]

And better sanitary arrangement for the prevention of cholera among Railway coolies at Gauhati was also made in 1900. [52] It was opened on temporary basis, usually during the emigration season. [53] In Sylhet no special cholera camp had been established where labourers are few and the magistrate was given responsibility when there was any emergency.[54]

And for the natives in 1863 one charitable dispensary in the district of Sylhet town was established where a large number of people attended the dispensary.[55] The circumstances for opening that dispensary was when portions of the lives within the districts was carried off by cholera. Therefore for those who are unable to pay for medical treatment, a building was set-up, though the treatment they got from it did not meet as one wished. Still, it was the only available charitable dispensary where the Government gave usual assistance. And the native doctor was put inchagre on 27th 1863. Thereby, the hospital was filled with patients who had taken the benefit heed out.[56] Later on, another dispensaries was established at Cachar and at Silchar town in 1864 and at Panchgram in 1872[57], and the Branch at Brahmangram in 1873. The medical provisions available were very poor. There were not much well buildings where indoor patients can be admitted. In few dispensaries only indoor patients were admitted. However, at the other small branches only outdoor patients were treated.[58] Of all total available dispensaries in 1875, it was increased to 16 in number.[59] For cholera injection vaccine was practiced among tea garden immigrants. In 1894

[50] ASA, Government of Bengal 1872, File no.186/322, No.1-6
[51] ASA, Assam secretariat, Revenus A, prigs, No.65-88, p-9
[52] ASA, Assam secretariat, Revenus A, prigs, No.65-88, p-9
[53] ASA, Assam secretariat, Revenue- A, April 1900, No.65-88
[54] ASA, Government of Bengsl 1872, No. 4/5, Progs for January
[55] Hunter, W.W, *A Statistical Account of Assam,* B.R Publishing Corporation, Delhi, 1879, p-344
[56] ASA, Dacca Commissioner paper, Cachar paper, File No.44, p-1-7
[57] ASA, Government of Bengsl 1872, No. 4/5, Progs for January
[58] Ibid, p-470
[59] ASA, Administration report of the province of Assam 1875-76,p-144

M.Haftkine commenced inoculation in February in Cachar while cholera occurred in Kalain, Karkuki and Degubber Tea Estates.[60] Since march 1919 all persons emigrating to tea estates in Assam are injected with one dose of the anti-cholera vaccine before being dispatched from the local agencies in the recruiting districts, and that measures had proved most successful in preventing outbreaks of cholera among the emigrants both while in transit and after the arrival on the estates. But it was a great misfortune that inoculation was suspended after a short period owing to shortage of vaccine. [61]

In 1924, for the purpose of cholera under consideration, an epidemic section was formed. The section consist of a small number of medical men with a subordinate personnel especially trained in water duties and rural conservancy generally. This section were provided with materials and was operating under the orders of the Director of Public Health. They were ready to move instantly to any affected or threatened area of epidemic diseases. Such a unit with its personnel and materials was most useful to combat epidemics, especially cholera. Cholera was endemic throughout the year in Cachar and Sylhet. Sub-assistant surgeons in charge of the dispensaries assisted by a few supernumerary sub-assistant surgeons and three temporary epidemic doctors especially appointed by the Local Boards to deal with the epidemic rendered medical aid to the sick and took preventive measures as far as practicable. Inoculation played a part in checking the spread and duration of the epidemic. In Goalpara district the services of the assistant and sub-assistant surgeons on kala-azar duty were temporarily utilized to deal with the epidemic. In all these districts supernumerary sub-assistant surgeons when available were sent by the inspector-general of civil hospitals, Assam, whenever the local staff could not cope with it and the civil surgeon asked for additional help.[62]

Scheme for cholera research or bacteriophage during 1935 and 36 was undertaken from the correspondence where the money for that grant was accepted to the scientific advisory board of the India Research Fund Association. Grants from England was also administered. But it was not clear from the correspondence where the money for that grant was coming from. It was presumed that no money was forthcoming for the

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[60] NML, Powell Arthur, 'Results of M.Haffkines anti-choleraic inoculations in Cacahr',Indian Medical Gazette, July 1895,p-253
[61] ASA, Assam secretariat proceedings, Education department, Public health A, A pril 1922,p-4
[62] ASA,APHR, 1924,P-9

future research on cholera. The Research society makes out a good case for claiming a substantial proportion of the grant and proposed a bacteriologist essential for the work. Got financial assistance from the IRFA sufficiently at any rate to meet the cost of work on these lines. It was the proposals that wanted the new grant from home to finance.

Cholera in Assam had indicated the usual bi-annual epidemics which was originated not from some epidemic area in Assam, but were introduced by already infected persons among the laboring classes who enter Assam twice a year for agricultural or other work from cholera areas in the neighbouring districts on the western borders. Geographically there appeared to be the only main portals of entry, one Goalpara, for the upper valley and the other Sunamganj and Habiganj for the lower valley. It was proposed to attempt to place a barrier against the introduction of cholera into the two valleys in Assam by bacteriophage distribution on the scheme devisesd by Col. Morison, in three districts. Habiganj was under control and complete control of those barriers included control of the railway and steamer routes through the districts concerned and the co-operation of the railway and steamer companies therefore was necessary.

The measures for the control of cholera in the districts of Assam upto eastern part including Nowgong was successful to some extent. It was also considered that by the end of the year Nowgong still remained free from cholera, and its five years immunity had proved the efficacy of Bacteriophage so far as one single district can do so. Later on, it was proposed to abandon again Nowgong bacteriophage experimental area when the bacteriophage distribution was complete in Goalpara, Habiganj and Sunamganj to reduce the cost of the new enquiry.

The peculiar periodicity of cholera in Assam, Bengal and Bihar indicates that there was probably some epidemiological relationship between the seasonal outbreaks in those three provinces which may be traceable to an endemic centres and the epidemiology of the bi-annual epidemics in Assam traced, the origin and mode of spread. That investigation lead into other provinces bordering Assam and the permission of the local Government permitted concerned where necessary. Grant was made for bacteriophage work and undertook an independent inquiry on cholera. Sufficient funds was made to carry out the work thoroughly and a definite proof or

disproof of the efficacy of bacteriophage in stopping the spread of cholera was well contained.

However, the Government of India provided a grant from home except for cholera research in general, under central co-coordinating body that prevent the over lapping of work and ill distribution of funds on which a number of isolated enquiries on the same subject rendered was inevitable. Such a body was known as cholera commission and came into being in 1933-34. But due to lack of sympathy among certain influential members of the scientific advisory board in Assam, the government was not confident for their work. At the same time bacteriophage took a prominent place in cholera research and was intimately associated with every phase of the work, and connected with transmission, infectivity, epidemiology which was difficult to know and was ignored by any unprejudiced observer.

All the money was spent on bacteriophage research and was worth to state on its merit basis as one of the main lines on which work on the prevention of cholera in India was directed. And for Assam the work was extended for the same. The main object of the scientific advisory board was that of the unique position of Assam, geographically in regard to cholera, its prevention and cure. The work was rested on cholera commission and for instance epidemiological enquiry was carried into other provinces. But till then there was no legislation exists to enforce the removal of cholera cases from steamers, trains. Though it was true that special regulations under the epidemic diseases Act of the law on the subject was somewhat meager and failed to provide for legal detention in hospitals, the facts was under the Railways Act. It was illegal for a patient with an infectious disease to travel by train but to travel safely as directed by the Railway authorities, i,e., in a special carriage that is under proper condition as to segregate the infectious people from others. Officers of the public health department enforce the removal of patients suffering from such diseases from streamers, and were removed to the nearest isolated hospitals. But the snag with regard to the isolation arrangements were so few and inadequate. The steamers companies, and quite possibly the Railways, when asked to co-operate in the scheme raised the question about the provision of isolated hospitals. They did so when revising Inland steam-vessels rules. The absence of isolation arrangements ceated similar difficulty in respect of travelers by country boat. And the defective character of the law was thus the real obstacle to this scheme. The scheme also provide

equivalent sum for manufacturing and distribution of phage and made provision for Habiganj and Nowgong.

For the experiment, Epidemic units consisting of three sub assistant surgeons was established along with one at Habiganj and the other at Sunamganj. In Goalpara, there were two epidemic units. One was located within the district but one was not sufficient to look after a large and widely scattered area. Distributions owed to difficult communications and admitted slow in those sub divisions. The provisions of the boat had greatly accelerated the distribution of materials to assist for the prevention of an outbreak of the disease.[63]

In regard to bacteriophage distribution in rail and steamer, the distribution was done almost entirely through their own respective affairs. The distribution was carried out by traditional boats by a staff recruited for that purpose at important ports. These water-ways reduced the estimated extra cost by transferring all activities regarding bacteriophage from Nowgong and Habiaaaagnj to Goalpara which was regarded as the gateway of infection into the Assam valley. It provides funds on the subject to a maximum of Rs.10,000.The scheme was drawn by Col. Anderson who was new to Assam and had no personal knowledge on bacteriophage conditions and limitations under which experiments was practiced. The other Col. Morrison was long back in charge of public health work in the province. An analysis showed that among the bacteriophage group 70 persons died in two days. An established work of bacteriophage form the basis of the treatment and prevention of cholera in villages was found successful and the Government of Assam retained the services to continue the work.

And the other mode of treatment was Sir Leonard Rogers's treatment of cholera with hypertonic saline and pomegranate was the greatest advance hitherto in the treatment of cholera. In 1,000 cases under his charge in Calcutta hospital obtained a mortality rate of 25 percent. During 1931 2,472 cases of cholera were treated in the Calcutta hospitals with 426 deaths, were the actual total deaths from cholera in Calcutta was 235.

[63] ASA, Local Self Government, Public Health Branch, B.Progs, March 1 935, p-1-61

On the other hand, Laboratory studies at Shillong were linked with studies by the staff of the National Institute for medical research. The Government of Assam holds the experiments for six years. But anti-cholera vaccination was stopped in the experimental areas and approved extension to other areas. However, for further extension, Government of Assam had insufficient fund. Recognizing that the work was at an important stage and the Government of Assam approached the Government of India on the plea that the control of cholera by that method was of imperial as well as provincial interests and that it had a bearing on the prevention of cholera at pilgrim centres and the spread of the disease from India to Arabia. But unfortunately the Government of India was unable to give more assistance beyond what they had already given through the Indian Research Association. The royal society had overdrawn the anonymous bequest and supported till the 31st December 1934.[64]

In Habiganj sub division, bacteriophage was again introduced in July 1932 for the use in the same way as in Nowgong, and controlled three small epidemics on the borders of the sub division close to Eastern Bengal and was successful. In the year between 1934-35, no field work in connection with the bacteriophage experiment was directly carried out by the enquiry. Only distribution of bacteriophage in Nowgong and Habiganj was continued by Public health department at Government expenses and there was no epidemic of cholera in either of the areas under experiment. The significant effect of bacteriophage in Nowgong districts Habiganj was the fact known that kept free from epidemic during for a period of five years. And the peculiar geographical situation of the Brahmaputra and the Surma valley of Assam offered an unique opportunity for devising a field of experiment to test the efficacy or otherwise of bacteriophage in reducing the infectivity of natural borne cholera and the possibility of throwing up a protective barrier to prevent the extension of cholera into other areas. It was not endemic in any of the five districts in Assam, but that it was imported from some point or outside the province. In Nowgong an experiment was proved effective for five years resulted in the same freedom from cholera epidemics. And transferred the bacteriophage activities from Nowgong to Goalpara. A protective barrier similar suggested in the Brahmaputra valley was thrown up for the eastern portion of the Surma valley with an inclusion of Sunamganj and distribute Bacteriophage in Habiaganj for the protection of rail, steamer and country boats. The

[64] ASA, Local Self Government, Public Health Branch, B.Progs, March 1 935, p-1-61

experiment applied a protective barrier for the Surma valley presents many more practical difficulties than in the Brahmaputra valley.

But there was no such laws to prevent the importation of cholera into the infected districts. In some cases, Government adopted emergency procedure and applied in times when the danger of cholera was known to threaten the province.[65]

In 1943, in all the plains districts, there were sporadic cases of cholera along with the districts of Garo Hills and Sadiya Frontier tract. But there were no S.A.S in the Public health department to post in Sadiya of North Lakhimpur. There was much valuable lost before the S.A.S reached to this places while deputed from other districts due to bad communication and consequently many lives were lost before medical aid were rendered. One epidemic unit S.A.S was posted in each of the sub division of North Sylhet and Goalpara and were not sufficient to cover vast area when epidemic breaks out. In the district of Lushai hills and Naga Hills there was no S.A.S in public health department. In Sadiya, Lakhimpur, Goalpara, North Sylhet, Aijal and Kohima. A total of six Sub-assistant surgeon and peons of epidemics units were made available from the existing cadre of S.A.S, Public health department on survey duty in the province. These was pleased be treated as urgent owing to the present widespread cholera epidemic in the province. [66]Gradually, cholera was reduced into small mortality but the disease was dying out in the province. Another Government policy was the measures on malaria.

4.6 Anti-malarial measures:

The nineteenth century malarial measures was confined to giving preference to sanitation. By clearing jungles and stations and removing unhealthy sites to a healthy side and by making available of the treatment with quinine and the distribution of and sale of quinine for preventive and curative medicine were all the active measures adopted by colonial Government. In spite of highly inflicted with fever as like the other epidemic diseases, Government took serious turn in the first half of the nineteenth century. Positive measures adopted for anti-malarial measures were carried out at Pasighat, Lumding and Haflong. But that was also not carried out as it was required. The reason for being unable to carry out the task was given by the assistant

[65] ASA, Local Self Government, Public Health Branch, B.Progs, March 1 935, p-1-61
[66] ASA, Medical department, Public health Branch, 1943,p-3-4

Political officer of Pasighat who wrote the following notes on the progress of the operations at Pasighat in 1923. “Owing to the lacks of funds the ususal amount of jungle could not be cleared at the beginning of the cold weather of 1922-23”. Finance, which always stands as a barrier to carry out those measures, the practical anti-malarial measures carried out by Government as follows. In the year 1922, oil spraying was carried out from April to November. In the year 1923, the bed of the Morali stream was thoroughly cleared out in order to obviate the formation of stagnant pools as far as possible. The work was carried by the cooloie corps. In charitable hospital the number of patients (tribesman and outsiders) treated for malaria was 115 which was lees in number than the year 1922. With regard to Assam rifles the total number of treated for malaria was 320. The number of cases of malaria treated at Lumding hospital was 2,862. In Haflong the anti-malarial work was confined to ordinary routine measures and some permanent improvement was undertaken in the cold weather. Of the whole the results obtained of Government efforts in 1923 justified the small expenditure incurred.[67]

The results of the measures taken against malaria under the supervision of the public health department were successful in some parts of the province. In Lumding, the number of attacks of malaria per head per annum was almost halved. Favorable results were from Pasighat.[68]The sanction of expenditure on anti-malarial measures in Doom Dooma, Digboi, Pasighat, Sibsagar, Golaghat, Lumding, Cinnamara, Haflong, Nongpoh, Kachugaon and Gossaigaon during the year 1932-33 were. They employed one malaria inspector at Doom Dooma at Rs. 40. A sum of Rs. 1470 was sanctioned to meet the the wages of coolies entertained in connection with the antimalarial measures in Haflong, Kchugaon and Gossaigaon. They also sanction a grant of Rs. 360 to the medical officers, Assam Bengal Railway, in connection with the anti-malarial measures to be carried out at Lumding on condition that such amounts was not exceed Rs. 360 was necessarily paid and coolies were actually entertained in their daily wages paid were reasonable. And all the expenditure was met from the grant under the head “33 Public Health C. Epidemic disease-(a) malaria-contingencies-lump provisions for anti-malarial measures” in the budget for 1932-33.

[67] ASA, APHR,1923,P-10
[68] ASA, Assam secretariat proceedings, Education department, August, 1922, pp-1-6

At Kohima the amount of malaria contracted in the station was considerably large. In the Civil hospitals 35 to 45 percent of all sides examined for malaria were positive and some hundred of them were from Kohima in 1933. Frequently, anti-larval measures were undertaken. Primary important were given to supervise such measures by routine ethnological work and trained malaria overseer were employed. For that they chose a suitable local man as it was secured and give training. And that men worked under the supervision of the civil surgeon, their duties was to record and treat with larvicide breeding places of carrier species once weekly throughout the transmission session. But the area involved was large one and the problem was also large. So they extended to further make a complete scheme of control. [69]

The Director of public health in Assam asked for the sanction of money in every cases irrespective of the amount. But there was always a delayed usually happening in withdrawing the money and also a lot of extra work to the offices from the secretariat. So, the Government delegate powers money can be withdrawn directly from the lump anti-malarial.[70]The Director of Public Health itself made an investigation in August 1924 as to the causes for the alleged increase of malaria in the Haiakandi subdivision in Cachar district. The results of his investigation were as follows. The principal factors suggested as causing the alleged increase of malaria in the sub-division were:- certain deforestation operations carried out in 1922 in the sub division itself and in the neighbourhood of the sub division. And the construction of the Katakhal-Lala Railway and the production of borrow pits along the embankment. The branch line of the Assam Bengal Railway was commenced in 1919 and was completed in 1923 were the cause for the increase of malaria because cutting trees and forest produce to breed mosquitoes. A campaign against prevention of the particular anopheles mosquito the carrier in the various districts were the only sound method that was adopted. But due absence of funds for that purpose reliance must generally be placed on quinine. And the drug was sold at a cheaper rate. The general distribution at cheap rate of that drug materially reduced the death and sickness rate from malaria and the debility caused by that disease.[71] The use of quinine in treating malaria dates back to 1893. The Government of India sanctioned the experimental introduction into Assam under the scheme the quinine to the public was effective for treating malarial disease and other

[69] ASA, Local Self Government, Public Health Branch, P.H B, December 1933, pp-60-67
[70] ASA, Local Self Department, Public Health Branch, June 1935, p-7-8
[71] ASA, APHR,P-12

cases of kala-azar. At the initial stage, quinine was given to the patients. Thus Government extends the scheme to all post-offices, on lines identical with those adopted in Bengal. The extension of the scheme to all post offices in Assam was sanction three years later and in 1897 the retailing agency was increased by the inclusion of vaccinators. In 1898, with the consent of the Agent, Assam Bengal Railway, and the service of the selected station masters were also utilized as agents. They had a tendency to exaggerate the feverishness of Assam, and the consumption of quinine rose in 1898, when conditions were markedly unhealthy. But there was no room for doubting that the use of the drugs could be largely extended and was benefitted to the people was the reason of an increased sale of quinine in Assam. Encouraged by the Chief Commissioner at the substantial cost to provincial revenues. But there was a limited scale of quinine appeared because for the retailers it was a small profit and due to limited number of retailers agencies and it was also difficult to obtained supplies in the province. It was obtained from Sylhet, Tezpur and Shillong. And again in the year 1905 it was increased and a new and better arrangement were made for the better availability and sale of quinine. [72]

For the purpose of malaria measures, Assam medical research society was maintained by the grant received from government and donations received from the public.[73] At Pasighat, the Mahamia committee requested the Assam Medical Research society to depute research officers to survey the place of the report. In the year 1931, malaria research officer undertook an experiment on a small scale on the lines more or less outlined in the Bengal scheme. The scheme of the government of Bengal was for the treatment of malaria in the Burdwan districts with regard to the best method of malaria control and eradication in any particular locality. The essential feature of the scheme was whole-hearted co-operation of the people resident in any particular area where the experiment was undertaken. In 1931 Government of Assam approved a detailed experimental scheme for the control of malaria at Kachugaon. The place was selected because it was located at the center of a vast forest area where malaria was highly endemic. Till then, the Government annually spent considerable sum of money for malaria control in that locality. Later, an identical scheme was adopted in 1931. And the Government pleased to sanction the scheme to the assistant director of the

[72] ASA, Government of Eastern Bengal and Assam, General Department, Medical –A, April 190, p-1-5
[73] ASA, Medical B, Fecember 1935, p-2

Assam valley who had undergone a course of Mariology, and was placed in charge of operations. In April 1932 every case of malaria was brought under the treatment with complete course. The effect of treatment was watched microscopically. Every child in the locality was examined blood examination were undertaken in all cases. Every child with an enlarged spleen, no matter whether there were an exhibition of fever or not, were given a complete course of treatment. Every person in the locality were given prophylactic doses of an appropriate combination of preparations with a view not only to prevent relapses but also to prevent re-infections. The malarial remedies that were used in Kachugaon were quinine, inquine, atebrin and plasmoquinine. The work undertaken were experimented with extreme care. And those work undertaken bore fruitful result. That was the proved that malaria was redacted to almost a negligible amount in that area and was further satisfactorily controlled.

The amount of plasmodium supplied for experimental purposes to various places were as follows:

Kachugaon 70,000 tablets, Digboi 5000 tablets, Nongpoh 5000 tablets, Doom-Dooma, 5000 tablets.

The above area were made under control by Malaria Research Officer. Plasmoquine was the only treatment achieved in co-operation with the people residing in a particular area where experiment were undertaken or the treatment was carried out. But there was difficulty with mass treatment because as soon as the main symptom of fever subsides the people think that they were cured and do not think necessary to complete the course of treatment. That incomplete course of treatment usually had a bad effect. It tends to formed the young parasites in the man and turned into gamates which were quinine resistant and make those man a source of potent danger to the community as being reservoirs from the infected mosquito. So, they thought that in order to make treatment successful, they either laid legislation on the same lines as kala-azar treatment or by vigorous propaganda in co-operation with anti-malaria societies started throughout the whole province on the lines of Bengal Co-Operative Anti-Malaria Societies.

But in Assam, it was not yet possible to take up similar philanthropic works like that of Bengal which had already originated from Rai Bahadur Goapal Chandra Chatterjee, who was the backbone of the movement. Thus, a society was registered in

Habiganj sub-division, on the lines of Bengal. During the rains of 1931 a thorough malaria survey of Kachugaon was undertaken by the assistant director of public health of Assam Valley division. Some of the major findings of those survey were, curative treatment with quinine and plasmoquine, Prophylactic treatment with quinine and plasmoquine, Anti-larval and anti-mosquito measures, which were taken at kachugaon to minimize the incidence of malaria. At the same time further researches was carried out.

The work was again started in May 1932 and 347 acute cases, 23 relapses cases and 18 chronic relapse cases were treated. In the subsidence of fever, an absence of parasites in the peripheral blood, and relapse cases were considered as the criteria of cure for malaria, and the effects of the treatment were of immense success, as in nearly all cases, the fever subsided on the 4th day and only in 1.2 percent of the patients showed parasites on their peripheral blood on the 8th day. Prophylactic course were administered twice a week to all the officials and menials at Kanchugoan and their families. That reduced the incidence of attacks of fever from 12.4 percent in June to 6.4 in decenber though there was in December malaria incidence rose. Prophylactic quinine and plasmodium were also issued to children within half a mile radius to destry the reserviours of malaria parasites. 190 children were treated and the incidence of attacks of fever amongst them reduced from 5.16 percent to 0 percent in December and also the spleen rate from 93.7 percent.

In several cases, mosquitoes proof had been made in their dwelling houses that kept down the bushes and jungles which were apt to harbor mosquitoes near about the dwelling houses. Atebrin was supplied to experiment and was tried on 61 cases. Considered the criteria for cure, the fever subsided in 4 days in all cases, but the parasite lasted in peripheral blood in 10 percent of cases and 13.3 percent cases relapsed. The malaria admission in Kanchugaon dispensary felt down from 1714 in 1931 to 1170 in 1932 which further more testifies the efficacy. In spite of the fact that the year 1932 was a bad malaria year. Amongst the mass, the best course for minimizing incidence of malaria. The method adopted was the treatment of actual cases and the reservoirs i.e. the children up to the ages of 10 years. In addition to that in Gauhati laboratory, 1050 mosquitoes were dissected. Identification of larvae and adult mosquitoes were also carried on in Kachugaon itself along with the other work. Some specimens of mosquitoes were collected from Gossaingaon in August and

September out of which 684 were identified and 68 were dissected, but none was found infected.

The station at Kohima in the Naga Hills, out of 428 cases treated with plasmoquien in the civil and military hospitals, 56 were readmitted with malaria once, 12 of term twice and 6 on the three occasion. [74]In august 1st, 1934, a new system was inaugurated According to the new system each patient presenting himself for treatment was required to pay of fees of one anna on his/her first registration. From August 1934 there were greatly diminished numbers of malaria cases who were registered monthly. Introduction of the fee system was not however affected and the reduction of malaria case incidence was apparent in July 1934 and also because of the anti-larval measures adopted, or the heavy rainfall it had a beneficial effect. [75]

Experimental malaria control by the use of pryrocide 20 as an insecticidal spray were undertaken in a portion of the hyperemic tea garden in upper Assam and in a rural area near Gauhati. Special staffs were deputed for that purpose to collect accurate data in order to make a critical study of the results. Studies on infant malaria parasites rates were undertaken in hyper endemic tea gardens in Assam and their utility in the determination of various factors in connection with the epidemiology of and immunity in malaria was assessed. The comprehensive survey of Cachar districts in corporation with the public health department of Assam was made progress, organize free distribution of quinine and study the epidemiology of malaria in selected localities in the district.[76]

Paludrine treatment in Assam was undertaken at the request of Major General Sir Gordon Covell, Director of the malaria institute of India. The attitude of the population towards malaria had always been one of placid resignation, and they showed no enthusiasm for suppressive drugs. Attempts to persuade them to take such drugs never showed the reduction of malaria which would be expected. The results were directly proportionate to the degree of administrative supervision which can be provided. Two areas were selected for the trial. They were chosen because they were isolated and consequently there were little population movement, and the populations were, with few exceptions, employees over whom some measure of disciplinary

[74] ASA, Local Self Department, Public Health Branch, Public Health Prigs, March, 1935, p-16, 31-36
[75] ASA, Local Self Department, Public Health Branch, Public Health Prigs, June 1935, p-5
[76] ASA, Medical Department, Public health Branch, Public Health B, p-9-10

control could exercise. All other anti-malarial measures were suspended in May 1946 and the trial began on 8th July, 1946. The success of the suppressive measures was directly proportional to the efficiency of the administrative controls.[77]

Colonial responses on epidemics in Northeastern province and implementation of health policy had diverse effects. The colonial state health measures did not laid much extended effect on the native population as it was confined to community of Europeans and army. Regarding sanitation was also not considerable effect on the natives. Little improvement was made when sanitation department was organized but in rural areas sanitation was still neglected. By the first half of the twentieth century and colonial state enforcement of Epidemic Diseases Act took turn on the health of greater mass. In spite of these initiatives to control infectious diseases, the mortality rate was not decreased. Because the measures adopted were not practical to implement because of the ignorant and illiterate of greater mass. On the side of the Government, due to poor management of public health department, shortage of medical personal, insufficient funds allotted were the main reasons behind. Many times due to insufficient state funding necessary measures was unable to carry out. Gradually, when kala-azar was the main concerned of the government, special epidemic Board was created and began to employ more medical personnel. Hospitals and dispensaries were established. Various policy initiative were started as preventive measures. Vaccination was undertaken as preventive measures. However, all these efforts in the province had positive results. By 1920s and 1930s Public health measures reached its true structure and extended to general population. By educating the public through mass propagation in schools and public places were also made to create awareness about infectious diseases among the masses.

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[77] NML, Lomax P.H,Paludrine treatment enquiry in Assam, *Indian Journal of Mariology* , vol.1, 1947, p-389,393