Chapter V
Public Health and Sanitation in the Baroda State

Public Health is defined as a process of mobilising local, state, national and international resources to solve the major health problems affecting communities and to achieve Health For All by 2000 AD[1] Many different disciplines contributed to the growth of Public Health; physicians diagnosed diseases; sanitary engineers built water and sewerage systems; epidemiologists traced the sources of disease outbreaks and their modes of transmission; vital statisticians provided quantitative measures of births and deaths; lawyers wrote sanitary codes and regulations; public health nurses provided care and advice to the sick in their homes; sanitary inspectors visited factories and markets to enforce compliance with public health ordinances; and administrators tried to organise everyone within the limits of the health departments budgets. Public Health thus involved Economics, Sociology, Psychology, Law, Statistics, and Engineering as well as Biological and Clinical Sciences. Soon another important and emerging branch of medicine i.e., Microbiology became an integral part of Public Health. Public Health during the 19th Century was concerned with sanitary regulations and the same underwent changes.[2]

The Public Health administration in India actually started in 1869 with the appointment of a Sanitary Commission. The first Municipal Act was passed in 1884 in Bengal. But in the Indian context, J. P. Grant in 1939 could see that foreign models

[1] KK Dutta. Presidential Address. Indian Journal of Public Health 1995;39:31-38.
[2] Ibid

could not suited for First Doctor Intervention or for Primary Health Care. His recommendations were also incorporated in Bhore Committee Report 1946, for organising Community Physicians.[3] However it was the The Bhore Committee's Report laid the foundation of modern public health care in India:

"*Where people live in numbers and close to e*

ach other as in cities and towns, cleanliness has to be maintained as an important condition of public health. Dirt and refuse have to be removed from the streets. The drains have to be kept in good order. Abundance of fresh air has to be let in –and so forth. All this is called sanitation. With this may be combined several arrangements of public convenience comfort, and safety. For example, good carriage roads may be made. The roads may be watered and lighted. Appliances may be kept ready to put down fires.[4]"

Public Health

The term "public health" came into general use around 1840. It arose from the need to protect "the public" from the spread of communicable diseases. Later, it appeared in 1848 in the form of a law, the Public Health Act in England that crystallised the efforts made by society to protect, promote and restore people's health. [5]

[3] Deoki Nandan. Indian Association of Preventive and Social Medicine 26th National Conference, Govt. Medical College, Surat, Presidential Address 27.1.1999; Indian Journal of Community Medicine 1999;24:137-139. also see , Thakur HP, Pandit DD, Subramanian P. History of preventive and social medicine in India. J Postgrad Med 2001;47:283

[4] Minor Hints p. 183

[5] K Park, Preventive and social medicine seventh edt. ,Banarsidas Bhanot publishers, Jabalpur,,ISBN 81-900118-9-8, 1997,P 39

While Public Health made rapid strides in the western world, its progress has been slow in the developing countries such as India where the main health problems continue to be those faced by the western world 100 years ago. The establishment of the World Health Organisation (WHO) providing a Health Charter for all people provided a great fillip to the public health movement in these countries.[6]

In 1920, CEA Winslow, former Professor of Public Health at Yale University, gave the oft-quoted definition of public health. The WHO Expert Committee on Public Health Administration, adapting Winslow's earlier definition, defined it as:

Condition of Hygiene and Sanitation in India during the first half of the 20th century[7]

A survey of the condition of hygiene and sanitation of India in 1930s found that a great majority of the population of India resides in villages, most of which were unclean and had filthy surroundings. The streets and roads were uneven with the result that water gathered into pits which became breeding places for mosquitoes. The animal dung and the refuse of the houses collected in pits near the houses were turned into manure. With such conditions in and about villages, a citizen who first visits a small village would find it intolerable to stay there even for a day. Add to this the monsoon conditions when the village turns into an island infected by an army of mosquitoes spreading malaria, and the grim picture of the insanitary condition of a village can be realised.

[6] K Park. Man and Medicine: Towards Health For All. In: Park's Textbook of Preventive and Social Medicine; 15th edn. Bhanot publication, Jabalpur 2005. pp 1-10.
[7] "Education for Health", R.M Dalal , Baroda Blue Book, 1937

Conditions in Cities and Towns:

The condition of the rest of the population living in cities and towns was not more enviable. If the people in villages were healthy in spite of these unsanitary conditions, it was the pure air and more strenuous agricultural activities and that were responsible. In cities, however, people crowd together in great numbers and hence they do not get sufficient air and healthy nourishing food. The slums in big cities were considered living hell on earth. People residing in such tenements simply lived as something given, even though they look so haggard and worn out. It was only a very small percentage of people who were fortunate enough to avail themselves of the various sanitary devices that are now utilized in big cities. The smaller cities and towns were mostly unaware of the sanitary fittings and the great advantages that accrue there from.

Personal and Social Hygiene:

The question of hygiene, both personal and social, was still puzzling. People had not learnt sufficiently to look after themselves. They would put on dirty linen, would not have a proper bath, would spit anywhere, would ease themselves indiscriminately at any place and would remain indifferent even in matters of infectious diseases such as smallpox, measles, etc. Those who remained indifferent to their own safety can hardly be expected to have an idea of their responsibility towards society.

The position in Western countries was quite different. People in the West were particular about their health and took every possible step to drive away diseases from their countries. They tried to keep their houses, streets and roads neat and tidy, their

tanks and reservoirs clean, their surroundings healthy and their conveyances orderly. The municipalities and borough councils kept a sleepless watch over the workings of their staff so that no insanitary conditions prevailed within their limits which might invite disease and undermine the health of the residents. The working of the hotels also deserves notice. In hotels, time was fixed for every thing and only scheduled things for which a menu was given to the guest were provided and nothing else. This regularity of time and food goes a long way in forming good habits of proper diet. Contrast with this, the hotels in Indian towns and villages where any food was provided at any hour of the day. The school committees were also careful in arranging the time table, in providing food and milk to children, providing sufficient heat in the class room, and in looking after various details. They, in the West, look at all such things from a national point of view, and try their utmost to save every human being from the ravaging hand of disease by providing the utmost sanitary and hygienic conditions in all walks of life, Our condition was quite the reverse. However, India had now come to understand the value of hygiene and sanitation for the preservation of one's health. Attempts were also made by municipalities and local boards to preserve sanitary conditions within their limits. But the subordinate staff entrusted with the execution of schemes to fight diseases had yet to rise higher and imbibe a greater sense of duty and responsibility. People had also to become health conscious. They should also become aware of the necessity of preserving hygienic and sanitary conditions for the uplift both of themselves and of the society.

The general condition mentioned about India were also prevalent in the Baroda State . However, in particular, the Gaikwad State worked quite vigilantly to provide a proper Public Health Administration .

Public Health Administration in the Baroda State

Public health is a very basic and prominent issue of concern for any state. The over all development of society and state was and is dependent on the well being of their subjects. As regards public health, the State Government of Gaikwad, took a number of measures to improve the health condition of the masses. Since 1876, it is visible from the Huzur Political Records of the Baroda State that, State Government made regular arrangements for improving the health condition, of its masses by encouraging vaccination, sanitary and other hygiene work.[8] For instance when small pox made its rapid appearance in Bombay Presidency in 1876, regular arrangements for vaccination of school children were made in the Baroda State .[9] A systematic and organised progress in the direction of public health began with the establishment of the Sanitary Department in 1891.

The notion of Public Health, prevalent among the Gaikwad rulers reflects from these below mentioned lines:

"the science and art of preventive disease, prolonging life, and promoting health and efficiency through organised community efforts for the sanitation of the environment, the control of communicable infections, the education of the individual in personal hygiene, the organisation of medical and nursing services for early diagnosis and preventive treatment of disease, and the development of social machinery to ensure for every individual a standard of living adequate for mainatnence of health, so

[8]H.P.O. D.No.480, F.No.199/37. Dairy of CMO
[9]H.P.O. D.No.480, F.No.199/46, Letter of request CMO to Dewan, to provide permission to Vaccine School Children of the Baroda State.

organising these benefits as to enable every citizen to realise his birth right of health and longitivity."[10]

Establishment of Sanitary Department

There was no Sanitary Department prior to 1891. Before that sanitation was under the control of municipalities and by *tavijdars* or Revenue Circle Iinspectors, in villages.[11] Every town and village had a staff of sweepers who performed such service as the people demanded of them. A Sanitary Commissioner with suitable establishment was appointed for the whole state in 1891.[12]

The administrative agency consisted of the Head of the Revenue Department, with the Sanitary Commissioner as his assistant. The executive agency consisted of the Municipalities and the Vishishta and Village Panchayats. The subordinate staff consisted of District Sanitary and Vaccination Inspector and a number of taluka Vaccinators.

The sanitary office to performed following important duties:

- Supervision of sanitation and annual inspection of Municipal and Panchayat offices
- Registration of birth and deaths
- Vaccination
- Delivering popular lectures on sanitation
- Carrying out preventive measures from epidemic along with medical department

[10] WHO, Technical Report Series, No55, 1952
[11] The Gazetteer of Baroda State, Vol.II Administration 1923, p. 375
[12] H.P.O., D. No.481, F.No.48, State Sanitary Arrangements

Arogya Rakshan and other rules

Besides the creation of the department, Rules and the Regulation of Public health *(Arogya Raksha Niyam)* which were passed in 1901, laid down precise instructions to be followed by the people. These [13] were applied to villages, and the Revenue Circle Inspectors were expected to execute them. The most important work done under these rules is the isolation of the manure pits, (*ukardas*, in some of the villages.) Rules regarding *ukardas* and sites to serve as latrines, were laid down for example: how far to keep from the houses on the village site and what measures could be taken to prevent them from being offensive. Rules for cleaning wells, regulation of fairs and similar other matters were also made in 1901. In addition to the Circle Inspectors, Sanitary Inspectors also saw to it that these rules were properly carried out.[14]

Re-organisation

In the beginning, the functions of the Sanitary Commissioners were mostly advisory in nature. He had no funds at his disposal. He toured the district, inspected Sanitary arrangements in villages and towns, and gave a number of suggestions to the Village Boards and Municipalities. He had no power to see whether his advice was acted upon, or that the measures of Sanitary reform suggested by him were enforced. It was desirable to invest him with both; and for that purpose, it was found necessary to create a regular Sanitary Executive Service and to provide it with funds. A scheme for organising the Sanitary Department on the above lines was submitted to the

[13]The Gazetteer of Baroda State, Vol II Administration 1923, p.p. 375-381
[14]Ibid

Government and sanctioned in 1919-20; under this scheme instead of four Sanitary Inspectors, ten were engaged, one for each sub-division of a district, and their work and duty were properly prescribed.

The further organization of the Sanitary Department in relation to its duties in local areas, was awaiting replies from the District Local Boards regarding their readiness to adopt measures of local taxation. On receiving of their approval, a scholar for sanitary work systematically carried out with the help of funds from the Government, the Municipalities, and the Local Boards.

Sanitary Association

An association for the improvement of sanitation in Baroda city was established in 1911.[15] It had engaged a lady Health Visitor who paid annual visits to about 4000 houses and delivered talks on health matters mostly to females. Leaflets on health and hygiene were published by the Association from time to time and occasionally lectures on child welfare and other useful subjects were given. This Association was supported by Government, the Baroda Municipality and the public in general. The basic idea behind this association was that, if its present activities were sustained, it would be able to[16] render great sanitary service to the city. Similar Associations were also established in Navasari, Mehsana and Amreli.

Central Sanitary Board

[15] The Gazetteer of Baroda State, Vol II Administration 1923, p. 382 please also see Baroda administration Report 1911-12

[16] The Gazetteer of Baroda State, Vol II Administration 1923, p.382

A Central Sanitary Board was instituted in 1917-18, with the Minister as President and Sir Suba, the Commissioner of Education, the Chief Architect, the Chief Medical Officer, the Municipal Commissioner, a representative of Local Board and a Sanitary Commissioner as member to discuss all important schemes of sanitation and public hygiene relating to the whole State.[17] The board was invested with the powers of initiation and disposal, its orders had the force of the Minister in the Council with reference to matters within its scope.[18]

Due to inadequate and not sufficiently capacity to meet the growing work the Department re-proposed certain alterations to the Gaikwad Government and as a result the department was reorganised in 1930. The Sanitary Department submitted the following proposals to Government in the matter of the reorganisation of their staff[19] :

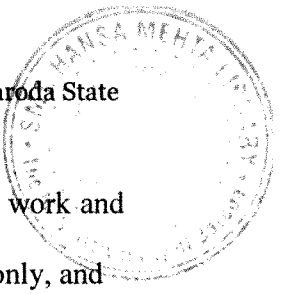
(i) Six additional posts of Sanitary Inspectors in the grade of Rs. 60 to Rs. 80 with a travelling allowance of Rs. 25 a month and six posts of peons be created and a yearly expenditure of Rs. 8,064 be sanctioned for five years,

(ii) Four lady health visitors be sanctioned at a cost of Rs. 2,880 for five years,

(iii) Six sanitary associations be formed in prominent places of the Raj and a sum of Rs. 6,000 be sanctioned yearly for five years,

(iv) Eight more health exhibitions and baby shows be held annually at a cost of Rs. 1,600 for five years,

[17]Ibid, p. 376
[18] B.S.A.R., 1917-18, p 250
[19]Baroda Blue Book 1931,P.7



(v) Six new magic lanterns and slides be purchased for propaganda work and their working expenses be met from the grant of Rs. 6,000 once only, and

(vi) The amount of Rs. 884 shall be sanctioned for office rent, dead-stock, contingent etc., and for the appointment of six new inspectors for five years.

The Government passed the following orders on the Department's proposals:

Before passing orders on the specific issues raised, the policy Council explained their policy in regard to the constitution of a regular "Sanitary Service" for the state.

Sanitary Service in Urban areas.

The need for a skilled sanitary service in the urban areas is apparent; and it is one of the most important duties of municipalities to organise an adequate and efficient staff to deal with the problems relating to public health which arise in their areas. Where there was a reason to fear that this responsibility would not be sufficiently realised, the Sanitary Commissioner had to advice the bodies concerned on the steps needed.

Sanitary Service for Rural areas.

In rural areas the conditions were entirely different. Here a regular sanitary service presented difficulties. There were large areas to be served; the people lived scattered in villages often at considerable distances from one another; while in one sense, rural sanitary problems were simple, the arousing of a "sanitary conscience" in the villager

was a demanding qualities of a higher order; and lastly the exiguous resources at the disposal of the State imposed a limit on the schemes of rural improvement which could be taken up for execution.[20] In conditions like these, experience, all over India showed that the utility of a rural staff of sanitary inspectors-each with a general mandate to improve sanitation over a large area, was doubtful.[21]

Functions of the Sanitary staff in Rural areas.

In rural areas, therefore, the functions of a sanitary staff were instructed to be:

(a) Dealing with epidemics like cholera, smallpox, etc.,

(b) Investigating endemic like guinea worm, hookworm etc., and instructing the villagers to adopt simple remedial measures; and

(c) Conducting intensive enquiries into the efficiency of services like vaccination.

A post of Assistant Sanitary Commissioner with laboratory equipment was also sanctioned by the Government.

To assist the Sanitary Commissioner in his duties, the Government sanctioned the appointment of an Assistant Sanitary Commissioner who had to be a medical graduate with a health degree. The pay was fixed at Rs. 150-300. The following allotments were also sanctioned[22]:

Rs. 360 - two peons for the Assistant Sanitary Commissioner.

Rs. 1,000 – laboratory equipment.

Rs. 360 – laboratory assistant.

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[20] Baroda Blue Book 1931, p.8
[21] Ibid, p.9
[22] Baroda Blue Book 1931, p.8-9

The Assistant Sanitary Commissioner had to keep himself in close touch with the latest curative methods in cholera, smallpox and other widespread diseases, both epidemic and endemic.

Action to deal with Epidemics

In dealing with epidemics, prompt action was the top necessity. The Chief Medical Officer and the Sanitary Commissioner had to issue orders under which (a) intimation of outbreaks had to reach the reserve Medical Officer in the district and the Sanitary Commissioner with the least possible delay (b) the reserve Medical Officer was to proceed to the affected village immediately with the necessary medicines, etc. [23] and administer first aid; and (c) the Sanitary Commissioner or the Assistant Sanitary Commissioner had to be on the spot and take over charge of measures without any loss of time.

General Preventive Measurers against Epidemic

General Preventive Measures against Epidemic disease had three main objectives[24]:

A. Protection against importation

B. Protection against lodgement when imported, and

C. Protection against extension when once lodged.

A. Protection against importation was obtained by

i. Prohibiting access to the town or to the village of a person coming from an infected area.

[23] Baroda Blue Book 1931, p.9

[24] The Medical Code of the Baroda State, Baroda State Press, 1930, p.p. 244, 245

ii. The setting up of a camp at the entrance of the town or the village, where persons coming from infected localities were to be kept in surveillance for a definite period, or

iii. A system of surveillance where by persons coming from infected localities were made to report themselves daily to some responsible authority, appointed for the purpose, for 10 days in the case of Plague, 5days in the case of Cholera, 12 days in the case of Small-pox and

iv. Prohibition of fairs and prevention of people from going to them and importing infection.

B. Protection against lodgement and C. extension after lodgement consisted in:

a) Taking urgent and drastic measures such as isolation of the sick, segregation of contacts, disinfection of personal effects and tenements and compulsory notification of both imported as well as indigenous cases in the beginning of an epidemic and prohibition of caste-dinners and other large gathering.

b) Being fully prepared to meet such eventualities so as to lose no time when they actually occur.

When there was lack of hospital accommodation, temporary sheds had to be erected or tents put up for the accommodation of the sick on a were – drained, well ventilated and yet shady site on the leeward of the town or village. [25]

[25] Please see Chapter IV of thesis for details of such arrangements provided by the State when an epidemic of plague and cholera and plague broke out, p.p. 20-40

The discharges of the infected patients were treated by incineration or by adding of strong antiseptic like Corrosive Sublimate 1 in 250 or Phenyle 1 in 5, or Izal or Cyllin 1 in 100. which was allowed to act for a few hours before they were finally disposed of.[26]

The clothes and bedding of the sick were either to be steamed or boiled as their condition may require or were burnt. The infected premises were subjected to any one of the following processes directed by the State regulation, keeping the situation in mind.[27]

a) Burning of the hut and all the rubbish and worthless stuff and filth contained in it, especially at the beginning of an epidemic.

b) Fumigation of the room occupied by the sick and all its contents (after hermetically sealing all slits in doors and windows which had been previously closed except one by gumming them with paper) either (1) by burning lbs[28] of Sulphur per one thousand cubic feet of space or (2) by placing 5 ozs[29] of permagnate of potassium in a strong wooden bucket and pouring over it half a pint of Formalin per every thousand cubic feet of space and then moving away from the site after closing the last door.

If the floor was made of earth, it was to be dug up to the depth about 6 inches deep, all round in the case of Cholera and the earth removed outside the town and buried. If this was not practicable, it was to be burned down. In times of Plague, it was

[26] The Medical Code of the Baroda State, 1930, p.245
[27] The Medical Code of the Baroda State, 1930,p 246
[28] Unit of measurement in pounds
[29] Ozs is Italian word for ounce, a unit of weight.

considered best to use Kerosene Oil Emulsion for the disinfection of floors, walls, etc.[30]

In 1935-36 the Sanitary department was placed under the Chief Medical Officer, with the designation changed to the Chief of the Medical and Health Department. This arrangement was continued till 1947- 1948.

Investigation of Endemic Diseases.

The investigation of endemic diseases like guinea worm was be taken up in selected areas and intensive work had to be carried out about it. A careful programme was framed for this work and implemented for a few years so that the best results could be secured.

Vital Statistics

Vital Statistics, is a branch of Statistics that deals with the changes and most basic events of human population, for example, findings pertaining to birth, mortality, marriage, and illness. Vital statistics is indispensable in studying social trends and making important legislative and commercial decisions. Such statistics are gathered from census and registrars' reports; vital records are also kept by physicians, attorneys, funeral directors, clergy, and similar professional people.[31] Like U.S. today national statistics are compiled and published by the Public Health Service of the Department in the Baroda State.

[30] The medical Code of the Baroda State, 1930, p. 247
[31] Microsoft Encarta Encyclopaedia, 2009 software

In the Baroda State the returns of birth and death were introduced in 1879. Until 1901 in villages the *patels*, headmen, and in town , the police registered births and deaths and sent a monthly return from these registers to the taluka V*ahivatdars.*[32] The latter forwarded the tabulated return for all villages and town to the Sanitary Commissioner, in whose office, the statistics for the whole state were compiled. The duty of reporting births or deaths were under this arrangement imposed upon the village watchmen and on the family; but results were always unsatisfactory[33]. It was probably due to lack of awareness about its importance which the people at that time did not realized. New rules were framed in June 1901. Under them, in the Municipal town, it was the duty of the Municipality, and in rural areas of the village headmen, to keep a register of births and deaths. Vahivatdars, Niab Suba and Subas were required, when touring their districts, to inspect the register and to see they were properly kept. It was only in the city of Baroda and some of the larger Municipal towns that the head of the family was bound, within a fortnight of the event, to send information about births and deaths in his family to the office of Municipal Inspector of the ward ; failure to do so rendered him liable to a fine.[34] The bulk of the population was unable to appreciate the utility of such information even in the 1920s , and they considered it as an unnecessary interference with the privacy of domestic life. With the provision of law sitting loosely on the shoulders of an ignorant people, the success of the system mainly depended upon the efficiency of the staff employed and on the diligence with which their work was tested and checked.[35]

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[32]The Gazetteer of Baroda State, Vol II Administration 1923, p. 377
[33] The Gazetteer of Baroda State, Vol II Administration 1923, p. 377
[34] Ibid
[35] Ibid

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The following table gives particulars about births and deaths in the whole State from the year 1894-95 to 1946-47:-

Year	Number of Births	Number of Deaths	Ratio of Births Per Mile of Population	Ratio of deaths Per Mile of Population
1894-95	36,276	41,166	15.0	17.0
1895-96	41,887	44,681	17.3	18.5
1896-97	38,909	36,366	16.1	15.0
1897-98	35,981	42,518	14.8	17.6
1898-99	42,040	49038	17.4	20.3
1899-19	31,403	1,31,261	13.0	54.4
1900-01	13,421	1,16,337	5.5	48.2
1901-02	42,020	57,898	21.5	29.6
1902-03	36,095	61,718	17.4	31.6
1903-04	39730	64,892	20.3	33.2
1904-05	43584	48,227	22.3	24.7
1905-06	42883	46,221	21.9	23.7
1906-07	42200	64,112	21.6	32.6
1907-08	47333	47,730	24.2	24.4
1908-09	48603	42,703	24.9	21.9
1909-10	48508	44,536	24.8	22.8
1910-11	53624	50,531	26.4	24.9
1911-12	58645	45,850	28.8	22.6
1912-13	53501	52,660	26.3	25.9

Year	Number of Births	Number of Deaths	Ratio of Births Per Mile of Population	Ratio of deaths Per Mile of Population
1913-14	62968	50,552	31.0	24.9
1914-15	62279	46,317	30.6	22.8
1915-16	63870	47,582	31.4	23.4
1916-17	62,778	54,205	30.9	26.7
1917-18	60,861	81,188	29.9	40.0
1918-19	46,998	1,29,132	23.1	63.6
1919-20	54,866	54,038	27.0	26.6
1920-21	53,730	41,995	26.4	20.7
1921-22	53,685	37,883	25.2	17.8
1922-23	56,183	48,506	26.4	22.8
1923-24	60,223	42,404	28.3	19.9
1924-25	56,235	44,428	25.4	20.9
1925-26	60,364	42,438	28.4	19.9
1926-27	52,138	41,701	24.5	19.6
1927-28	59,367	45,916	27.9	21.6
1928-29	57,636	48,395	27.1	22.7
1929-30	64,099	55,194	30.1	25.9
1930-31	66,685	41,658	27.2	17.1
1931-32	62,592	48,056	25.6	20.1
1932-33	67,817	49,045	27.7	20.1
1933-34	80,513	48,521	33.0	19.8

Year	Number of Births	Number of Deaths	Ratio of Births Per Mile of Population	Ratio of deaths Per Mile of Population
1934-35	71,326	58,150	29.2	23.8
1935-36	85,010	55,220	34.8	22.6
1936-37	93,057	52,415	38.1	21.4
1937-38	95,463	65,709	39.1	26.9
1938-39	98,166	64,655	40.3	26.5
1939-40	1,14,633	60,435	46.9	24.7
1940-41	1,07,047	67,138	37.4	23.5
1941-42	1,12,268	68.814	39.3	24.1
1942-43	1,02,118	71,356	35.8	25.0
1943-44	1,03,136	64,461	36.1	24.0
1944-45	97,294	70,320	34.1	24.6
1945-46	1,04,515	70,910	36.1	24.5
1946-47	1,03,242	65,605	35.0	22.6
1947-48	95,701	58,500	33.1	20.1

Major Causes of Deaths per mile of population, 1911-12 to 1926-27

Causes of death	1911-12	1916-17	1921-22	1926-27
Fever	16.5	18.3	13.09	15.52
Influenza	..	..	..	..
Plague	0.4	0.4	.007	0.oo4
Cholera	0.09	0.6	.001	0.005
Small-pox	0.9	1.2	0.1	0.17
Dysentery and Diarrhoea	0.4	0.7	0.2	0.47
Cough	...	1.4	0.6	0.66
Pneumonia	1.0	0.1	0.1	0.11
Consumption	..	0.3	0.4	0.50
Injuries and Accidents	0.2	0.2	0.2	0.27
All other diseases	2.7	3.1	1.9	1.88
Total	22.6	26.7	17.8	19.63

Major Causes of Deaths per mile of population 1932-33 to 1947-48

Causes of death	1932-33	1937-38	1942-43	1947-48
Fever	16.3	22.5	21.1	17.4
Influenza	..	..	0.1	0.1
Plague	0.1	..	..	00
Cholera	0.0	0.1	0.1	0.1
Small-pox	0.06	.05	.02	0.4
Dysentery and Diarrhoea	0.2	0.3	0.4	0.2
Cough	0.6	0.6	0.5	0.3
Pneumonia	0.1	0.2	0.1	0.1
Consumption	0.4	0.4	0.2	0.1
Injuries and Accidents	0.2	0.2	0.1	0.1
All other diseases	1.8	2.1	2.0	1.6
Measles	..	.09	0.4	0.06
Typhoid	..	..	0.3	0.1
Diphtheria	..	..	0.003	0.002
Meningitis	..	..	0.002	..
Total	20.1	26.9	25.0	20.2

The Baroda Administrative Reports suggest that the major cause of the death from 1912 to 1948 was Fever. The highest reported case of death by fever. From these figures it would appear that deaths from fevers predominated over those from the other causes[36]. As the agency recording deaths was untrained and consisted of low-paid clerks and ignorant *patels*, headmen, the registered causes of deaths were not

[36]The Gazetteer of Baroda State, Vol II Administration 1923, p. 378

very reliable upto 1923. The first thing that strikes one is the high proportion of death ascribed to fevers. More than 68% of the total mortality is accounted under this head. This is mainly due to the difficulties in diagnosing all but a few well defined causes such as cholera, dysentery and small pox, but most other complaints were classified indiscriminately as "fever". Several deaths due to other causes such as consumption, pneumonia, measles, acute inflammation or whooping cough were wrongly ascribed to fever simply because that symptom is a prominent feature of these diseases. As long as registration was in the hands of non-professional and untrained hands such as village *patels* and *mukhis*, this state of affairs was continued.

Vaccination

In Baroda State in the reign of Maharaja Ganpatrao Gaikwad, 1847-51, Vaccination was introduced the influence of Captain French, the Resident at Baroda.[37] A Vaccination Department had, therefore, been in existence in the Baroda State for more than 20 years before the administration of Sir T, Madhavrao. It was subjected to in-depth reforms by this distinguished statesman, and periodical returns were demanded of the operators whose work was carefully checked. In the second half of 1876 Sir T. Madhav Rao wrote a letter to Dr. T. Cody, the CMO, to prepare arrangements for the reorganisation of vaccination Departments, with its allotment in four different division of the Baroda State[38]. Gradually the work was transferred to the Medical Department and by 1880-81 the work of the Vaccination was under the supervision of the Chief Medical Officer and was carried out by three inspectors, thirty-one vaccinators, eight probationers and thirty four peons with yearly salaries amounting

[37] The Gazetteer of Baroda State, Vol II Administration 1923, p. 378
[38] H.P.O. D.No.480, F.No.199/46, Letter of Dewan to T.Cody July 1876

to Rs. 13,473. Two operators were delegated to the city, nine to the Baroda District, ten to the Kadi District, six to the Navsari, and four to Amreli district.[39] The head vaccinator at |Dwarka also inspected the work done by the vaccinators in each district. After the reorganisation of the department, annual reports on the working of the Vaccination Department was sent to the Sanitary Commissioner on their requisition, since Government of India under British rule required it for its annual report. The total number of Primary Vaccinations and Re-vaccinations performed during the year 1880-81 was 60,984 and 202 against 52,042 and 232 respectively in the previous year. The total cost of these operation in 1880-81 was amounted to Rs. 13,485, that is about 0-3-7 per each successful case. When the Sanitary Commissioner's post was created in 1891, vaccination work was placed directly under his control and supervision.[40]

Vaccination Act, 1914

A Vaccination Act, (Act VII of samvat 1967), was passed in 1914, under which vaccination was made compulsory.[41] At that time it was applicable only to the city of Baroda. In the villages and other towns of the state vaccination still remained a matter of persuasion.[42]

Improvements

Many innovation in vaccination were introduced in the first half of the 20th century. Glycerinated Lymph was used since 1909 all over the State, and redistribution of

[39] H.P.O,D, no 481, F.No. 46-A, General Correspondence, p.15
[40] The Gazetteer of Baroda State, Vol II Administration 1923, p.380
[41] H.P.O,D, no 481, F.No. 46-A, Huzur Order, p.22

[42] The Gazetteer of Baroda State, Vol II Administration 1923, p.381

work among the vaccinators had been effected by increasing their strength from 35 to 40. Vaccination on antiseptic lines was introduced and vaccinators were trained in antiseptic methods, in different hospitals and dispensaries of the State.

The following table gives the number of vaccinations and re-vaccinations from 1909 to 1946:

Year	Total number of person vaccinated	Total number of person revaccinated
1909-10	55938	6432
1910-11	58947	2635
1911-12	62696	1182
1912-13	60935	749
1913-14	62223	230
1914-15	64143	382
1915-16	66659	864
1916-17	63368	1,421

Year	Total number of person vaccinated	Total number of person revaccinated
1917-18[43]	60177	1306
1918-19	62532	1487
1919-20	62041	4381
1920-21	61051	4524
1921-22	63292	3134
1922-23	61255	2704
1923-24	65001	4376
1924-25	65606	3871
1925-26	64690	3850
1926-27	65689	8958
1927-28	67452	2404
1928-29	66981	4576
1929-30	68431	17392
1930-31	67815	7415
1931-32	74199	3501
1932-33	73134	5143
1933-34	78973	5801
1934-35	90418	27989
1935-36	87934	14963
1936-37	92488	17100

[43] B.S.A.R. 1917-18, p248, Vaccination was made compulsory in the city of Baroda in 1914 tentatively for three years, and in the year of report the measures were made permanent for the city; and continued to be carried out in the other parts of the territory.

Year	Total number of person vaccinated	Total number of person revaccinated
1937-38	90700	18091
1938-39	87573	17533
1939-40	96,000	46900[44]
1940-41	93926	58052[45]
1941-42	96216	79778[46]
1942-43	96538	69992
1943-44	94594	101161[47]
1944-45	95770	94594
1945-46	96243	107176[48]
1946-47	96148	92325
1947-48	94486	88309

The number of successful primary vaccinations numbered 60,147 during the year 1921-22 and the rate of protection afforded per mile of population per annum was 29.0 as against 28.5 in the previous year.

Improvement in Public Health

[44] Such great increase was due to small-pox epidemic in the state. B.S.A.R.,1939-40, P. 220

[45] Revaccination at the age of eight or at the time of registration of the name of the children in schools for the first time was compulsory in the Baroda City and district, in Okhamandaland the Mehasana district. This was the probable cause of increase in the number of revaccination along with the broke out of small-pox vaccination program. B.S.A.R..1940-41, p195

[46] It was found that due to large number of primary vaccination and revaccination in several districts of the Baroda State incidence of small-pox was less than that in the previous year. B.S.A.R. 1941-42, p 221

[47] The increase in the number of revaccination was due to re-vaccination being made compulsory in the Navasari and Amreli Diustricts. Bar, 1942-43,p,196

[48] Vaccination before the child is 6 month old and revaccination at the age of eight or at the time of registering the names of children in school for the first time was made compusary in the whole Baroda State. B.S.A.R., 1945-46, p192

In all the big towns, the water supply and sanitary arrangements were greatly improved after the establishment of a proper sanitary department. Gradual improvement could be seen in towns as well as in villages. It was one of the duties of the village Panchayats, established in every village since 1903-04, to look after the village sanitation and to keep the to village roads, wells, tanks, etc. in order. Nearly 50 towns had Municipalities, which derived, their funds mainly from octroi duty or house tax, and were responsible for sanitation.[49] District and taluka local Boards were also bound by law to look after the sanitation and Medical Relief was brought home to the general sanitation in the respective areas under their charge. Care was taken to guard against epidemic diseases at fairs and festivals where people assembled in large numbers.[50]

The protection of people from small-pox by means of vaccination made great progress and year by year the number of people vaccinated and revaccinated increased. Where public health suffered due to improper drainage, efforts were made to remove the defect by cutting artificial channels. The number of dispensaries established by Government was rapidly increasing and medical relief was brought home to the people through these institutions as well as through *gramya aushadhalayas* or village dispensaries.[51] Though there was room for improvement, these and other measures had a beneficial effect upon the health of the people.

Methods to Create Awareness

[49] The Gazetteer of Baroda State, Vol II Adminstration 1923, p. 382
[50] Ibid
[51] Please see the details of the same in chapter IV

Several methods were adopted by the Gaikwad state to generate awareness among the masses with the help of sanitary and medical departments. Under this a series of lectures were delivered by the higher officials of the Sanitary Department at various places annually. Conferences were organised by the Municipal and Vishishta Panchayat members and several questions were discussed.[52] Several small and large sanitary exhibitions were organised to educate people in matters of sanitation.

The scheme of the "Model Village" was explained to the different village panchayats and Tajvidars by a committee of the sanitary Commissioner, the Naib Suba of respective Divisions and the Vahivatdar of the respective Talukas and arrangements were made to scheme in operation.[53] Booklets were prepared by the Sanitary Commissioner on the topic of 'Model Village' giving details of the work to be undertaken. These were freely distributed to Subas, Naib Subas, Mahal, Panchayats and other concerned officials. This was appreciated by some of Subas who took real interest in sanitary matters.[54] However, there no further progress was made regarding Model Villages, owing to lack of funds and enterprise on the part of the local bodies.[55]

Time to time a number of articles were also published in the Baroda Blue Books related to dietary habits of the people, in which they emphasised on proper food[56] and discussed delimits of defective diet in the Gujarat.[57]

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[52] B.S.A.R. 1920-21, p. 329
[53] B.S.A.R., 1922-23, P,348 and B.S.A.R. 1921-22, P 345
[54] B.S.A.R.1923-24, P. 357
[55] B.S.A.R. , 1924-25, P336[5]
[56] "Proper food"
"Proper food must contain sufficient amount of building material for growth as well as to repair the daily wear and tear of our body. It must also contain certain factors

Apart from this, Government passed the order in 1937-38 to open a department, known as the Public Health Laboratory, to study the Dietary habits of different classes of population in the State and a survey was conducted by a medical officer specially trained for the purpose. Along with the survey, the officer carried out on educative propaganda.[58] In the same year rules were also published for preventing the adulteration of milk, ghee and butter.

In 1940-41 Food and Drugs Act was applied to Sidhpur and Navsari Municipalities and a number of samples of milk and ghee were examined in the Food Laboratary. The number of samples received from the municipalities where this act was applied, was 635 of milk and 90 of ghee; and of these 67% and 50%respectively were found to be adulterated.[59] The laboratory worked in collaboration with the Ghee grading Centres of the Department of Agriculture.

In the year 1939-40 the Food and Drugs Act was applied to Baroda City, Kalol, Dhinoj and Billimora. 248 samples of milk and 58 of ghee were analysed.[60] In the next year the act was extended to Kadi Visnagar and Amreli Municipalities. In the year 1942-43, 984 samples of milk and 86 of ghee were examined, out of which 661

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that will increase the resistance to diseases." Sources, Sanitary Commissioner Baroda, , "Nutrition" , Baroda Blue Book 1937

[57] Gujarath diet defective."The common diets of Gujarath both vegetarian and mixed are found considerably defective. When we eat food or feed others we hardly think whether it subserves all its uses. The poor people generally eat excess of cheap starchy food and take less of body building and protective foods as they are expensive. Rich people take too much of refined and soft food." Source, Dr. N. V. Pandit, Sanitary Commissioner Baroda, , "Nutrition" , Baroda Blue Book 1937

[58] B.S.A.R. 1937-38, p. 306

[59] B.S.A.R. 1940-41, p.196

[60] B.S.A.R.,1939-40 p.221

samples of milk and 35 of ghee were found adulterated. The offenders were prosecuted.[61]

In 1943-44, 1,647 samples of milk and 86 samples of ghee were examined, out of which, 1155 samples of ghee were found adulterated. In 1945 the Act extended to villages to prevent adulteration.

Health Exhibitions

Health exhibitions were held in 1915 and 1921. Exhibits were received from different Sanitary Association in the State, as well as from those in Ahmedabad, Broach, and other Centres, from Municipalities and from the State Sanitary Department. The Vaccination Department was transferred from the Medical Department to the Pragati Adhikari.[62] The most important work carried out during this year was to explain the new scheme to the officers and Panchayats and encourage them to take advantage of the Government Grant.

Home Hygiene as a subject was introduced in the higher standards of the Primary Schools and lectures in the same subject were annually delivered in a few towns. A series of lectures were also given during their tours by the Sanitary Commissioner and Sanitary Inspector by means of magic lantern slides and charts, on different subjects. Pamphlets on sanitation, maternity and child welfare were distributed amongst the general public and several new charts and slides on these subjects were

[61] B.S.A.R. 1942-43, p192
[62] B.S.A.R.,1919-20, P.314

prepared. A special draftsman was employed in the Sanitary Commissioner's Office to operate the magic lantern, and prepared slides, charts, etc.[63]

A permanent Health Museum , was set up in the Old Palace Durbar Hall in 1923-24 by the Sanitary Department .

Among the distinguished visitors there were Col. R.J Blackham M.D & c. formerly surgeon to the Viceroy, and /Miss Balfour M.D. the Head of Women's Medical Service in India and the organising secretary of Lady Chelmsford –All India Maternity and Child Wellfare League. Both of them were pleased with the material collected in the Museum and their arrangements.[64] The Museum was visited by thousands of people annually.[65] In the year 1926-27 it was visited by 6000 people[66] followed by 5000 people in next year[67] and 6000 in 1928-29.

Lectures

In the year 1914-15, Dr. A. D. Cooper was the in-charge of the office of the sanitary Commissioner. He delivered lectures on "the Evils of Over-crowding" at Nar, on "Ventilation and Air" at Kalol, on the "Necessity of observing the Law of Health" . A series of ten lectures on Home Hygiene was delivered to the Military Police, men from the Khangi Department and the general public[68]. The lectures were illustrated by diagrams and magic lantern slides.

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[63] The Gazetteer of Baroda State, Vol II Administration 1923, p. 382
[64] B.S.A.R. 1923-24, p 338
[65] B.S.A.R. 1923-24, 1924-25, 1925,26, 1927-28
[66] B.S.A.R. 1926-27
[67] Bar 1927-28, p. 274
[68] B.S.A.R. 1913-14,p 210

As part of the awareness programme and to inculcate good habits among the children almost every year, school masters were called at several sanitary centres and definite instructions on school hygiene were imparted to them.[69]

The members of British Social Hygiene Council visited Baroda in March 1927 and delivered a series of lectures to the medical profession and the public. A branch of Social Hygiene Council was formed at Baroda.[70] Literature on the subject was translated in the vernacular.

Cinema and Lantern Shows

Cinema and lantern shows were other methods adopted by the department to create awareness among the masses. Since 1934-35 visual instruction branch presented 130 cinema and 82 lantern shows in villages of 20 talukas of the State. In the next year this branch presented 147 cinema and 73 lantern shows. This activity became quite popular and continued in the state upto 1948. In the last year of the Gaikwad rule a total 95 cinema and 20 lantern shows were presented.

[69] B.S.A.R.1920-21, p.329
[70] B.S.A.R. 1926-27,p.240