

EAST INDIA (INOCULATION AGAINST CHOLERA  
AND TYPHOID).

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RETURN to an Address of the Honourable The House of Commons,  
dated 29 June 1900;—for,

“RETURN of CORRESPONDENCE relating to PREVENTIVE INOCULATION against  
CHOLERA and TYPHOID in INDIA.”

India Office,  
9 July 1900. }

ARTHUR GODLEY,  
Under-Secretary of State.

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*(Sir Charles Cameron.)*

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Ordered, by the House of Commons, to be Printed,  
11 July 1900.

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## TABLE OF CONTENTS.

No.	Document.	Date.	From	To	Subject.	Page.
1	Report (Extract).	1896.	Sanitary Commissioner with the Government of India.		<i>Anti-cholera inoculations.</i> Dr. Vaughan's report, with tables and remarks on one series of cases by Professor Hufkine.	3
2	Do.	1897.	Do.		Statistics for 1897. Outbreaks among coolies bound to Assam and Cachar and men of the Shropshire Regiment.	8
3	Do.	1898.	Do.		Continuation of operations at coolie depôt at Purulia.	
4	Letter	1899. 25th May (No. 98, Military), with enclosure.	Government of India.	Secretary of State for India.	<i>Inoculation against Typhoid.</i> Results of Professor Wright's operations. Asks for approval of the resumption of inoculation at public expense.	9
	Do. (Extract).	1900. 8th March (No. 36, Military), with enclosure.	Do.	Do.	Report on prevalence of enteric fever among British troops in India. Appointment of Major A. M. Davis in special bacterio- logical research.	10
6	Despatch (Extract).	1900. 10th May (No. 59, Military).	Secretary of State for India.	Government of India.	Reply to No. 5. Asks for returns showing comparative prevalence and intensity of enteric fever among inoculated and uninocu- lated soldiers.	11

# EAST INDIA (INCCULATION AGAINST CHOLERA AND TYPHOID).

No. 1.

EXTRACT from the REPORT of the SANITARY COMMISSIONER with the  
GOVERNMENT of INDIA for 1896.

M. Haffkine's inoculations were carried on in 1896, in Bengal, at first under M. Haffkine's own superintendence, and subsequently by Surgeon-Captain J. C. Vaughan and two assistant surgeons, acting under his general supervision. The total number of persons inoculated in Bengal, exclusive of Calcutta and its suburbs, was 4,413, most of whom were coolie emigrants proceeding to Assam. Dr. Vaughan's report with tables and remarks on one series of cases by M. Haffkine, taken from the Bengal Sanitary report for 1896 will be found appended to this chapter.

## *Anti-cholera inoculation.*

As a means of preventing cholera, anti-choleraic inoculation was also tried during the year under review under the supervision, first, of Professor Haffkine, and then by Surgeon-Captain Vaughan, Deputy Sanitary Commissioner of the Western Bengal Circle, and two Assistant surgeons acting under his general instructions. The following is Dr. Vaughan's report on the experiment:—

“The details now submitted are not quite complete; for although most of Professor Haffkine's papers have come to hand, there are, he says, probably some registers of inoculations still among his papers in Calcutta, which, owing to his continued absence, cannot be obtained in time to be available for the purposes of the present report. The figures and facts now submitted may however, be taken as an approximate statement of the work done in Bengal during 1896, and are set forth in the two following tables—one showing the number of inoculations performed in various places, and the other showing such results as I have been able to gather for this report. It will at once be evident that the table of results covers only a fraction of the actual number of inoculations performed; and that there are over three thousand cases in which the result of inoculation has not been ascertained, or in which there has been no result recorded. The reason for this is that in certain instances the communities among whom inoculation was performed have not since been visited by cholera, or that there has been no opportunity for making enquiries. This last remark applies more especially to the instance of inoculation among emigrants bound for the labour districts in Assam and Cachar, a class of people who furnish by far the largest number of subjects for inoculation. These emigrants for the most parts stay in the Purulia or other coolie depôts for only a few days after inoculation at the outside, and then proceed on their way, and it is in most cases extremely difficult to hear of them again, and the managers of most tea gardens have not responded to enquiries. Enquiries are, however, now in progress through the principal emigration (forwarding) agents whose coolies have been inoculated, and the returns will be reported when received.

In the table of results I have included certain cases inoculated at Belaspur Central Provinces. These are not, however, included in the table of operations done in Bengal. Among them were two cases in which cholera occurred immediately after inoculation, and who presumably had been infected prior to the time of inoculation. They both died within 48 hours. Besides these, there had been in the batch 14 cases and 10 deaths during the 24 hours before inoculation.

The table of inoculations done in Bengal does not include those done in Calcutta and its suburbs. Nevertheless there is among Professor Haffkine's notes a paper drawing special attention to one of the series of cases done in Calcutta, and as this paper brings out certain points and has a peculiar interest, a copy of it is attached as part of this report.

The operations were performed by Professor Haffkine, and by the various officers detailed for duty with him. Those done in Purulia and in the Manbhum district and in Kandra (with the exception of 491 cases done in Purulia in March and April 1896), were done under my supervision by myself and by Assistant Surgeons G. C. Mukerji and S. B. Boverji, both of whom

have been specially detailed for this duty. For myself, I have actually been engaged in performing these inoculations since May 1896, and was formally appointed to supervise the work in December 1896.

The operation of protective inoculation was at first done in two stages, *i.e.*, the inoculation with what used to be termed the "first vaccine" to begin with, and later on inoculation with the "second vaccine." For various reasons this was found to work inconveniently in practice, and as it came to be ascertained that it was quite practicable to omit the inoculation with the "first vaccine," the operation is now limited to inoculation with the "second vaccine" only.

Anti-choleraic inoculation, as far as I have known it and of it, *has always been strictly voluntary*, and the work has increased. I have said that a large section of what has been done has been among coolies bound for the tea-gardens. The conditions of emigrant travel are such that cholera is very frequent and often very destructive of life. It appears that the impression has gradually gained ground that the inoculated are not nearly so liable to be attacked as the uninoculated. When we first began work in Purulia, we had to go round the coolie depôts and inoculate whom we could persuade. Since then, Messrs. Driver and Stainforth, the principal forwarding agents in Purulia, have given expression to a decided preference for inoculated coolies; and a few days ago a tea planter from the Kalain tea estate in Cachar arrived in Purulia, selected two hundred coolies, and quite spontaneously had every one of them inoculated. This gentleman declared to me that most of the coolies on the garden are inoculated, and that the place is practically free from cholera. Coolies are now brought to my work-room regularly and daily, and last month in this way we inoculated no less than 1,776 emigrants. These details do not all strictly belong to the work of 1896, but are quoted to show how it has grown.

With regard to the table of results, I have arranged the subject here practically under four heads: (1) the incidence of cholera immediately previous to the performance of inoculation, (2) that subsequent to inoculation, (3) a comparison of the percentage incidence among inoculated and uninoculated, and (4) an approximate calculation of the reduction of mortality among the inoculated population and among the inoculated persons attacked. In this table columns 1 to 19 need no explanation. Column 20 shows the proportion between column 11 and column 17, and column 21 the proportion between column 12 and column 18, and column 22 that between columns 13 and 19. Thus, in the case of Serampore, we have the proportions 7·4 : 3·8 :: 1 : 0·51, and so on.

Column 23 is obtained from column 21 thus:—In the case of Pataspur we have the proportion 7·46 : 100 :: 1 : 13·4, from which we get the figures  $100 - 13·4 = 86·6\%$  = reduction (probable) of mortality. Similarly column 24 is obtained from column 23, where possible.

In some of the instances given, the figures are too small to give much to go on in the way of percentages. So that the same scheme of results has been worked out on the total figures obtainable. It will be noticed that the results in columns 1 to 7 are not brought to bear on those in columns 20 to 24, and the reason is obvious. From this table it would appear that not only do we have a reduction in the incidence of cholera among the inoculated, but that after inoculations have been done in any community, the incidence and death-rate among the uninoculated is apparently also reduced. (Compare columns 5, 6, 7, and 17, 18, 19), and in actual practice I have noticed in the case of the three villages of Bangurda, Beliadih, and Belma, and I think also in Gortopa, that there has been a remarkable cessation of cholera in the locality after inoculation, and the reason does not appear very difficult to find. For in the first place every one does not take cholera, and it is assumed that inoculation reduces mortality by 83%, the chances are 4 to 1 against the inoculated section taking cholera in any community. But this protection lessens the chance of cholera occurring in the uninoculated section, for taking a village like Baliadih there is less chance of cholera occurring in 74 uninoculated persons than if there were  $74 + 184 = 258$  uninoculated persons. The four instances referred to in which village outbreaks ceased in this way may be regarded as coincidences, but if coincidences come to be sufficiently multiplied, one begins to suspect their occurrence to be due to some definite cause hitherto unsuspected and unobserved. I only throw this out as a suggestion, but

Cholera has occurred in the inoculated households after the following number of days since the inoculation: (1) amongst the uninoculate

(3 cases.)  
(4 cases.)  
(2 cases.)  
(2 cases.)

(3 cases.)

(1)—1, 2, 3, 4, 5, 6, 9, 12, 13, 15, 17, 22, 34, 37, 44, 57, 62, 63, 71, 95, 99, 109, 114, 118, 119, 120, 129, 132, 139, 143, 162, 180, 191, 203, —, 240, 261, 271, 2

(2)—0, 2, 3, 4. \_\_\_\_\_ 219. \_\_\_\_\_

(3 cases.)

there are factors in the stopping of epidemics, such as the natural death of the virus and the causes which lead to that, in which I have not entered here, and which may co-operate with protective inoculation in putting an end to an outbreak. I have not forgotten, too, that so far I have brought forward only four instances, but this is only from the incomplete records of 1896. I trust that later on I may find similar instances for further report, and during the current year, as long as I am engaged in this work, I intend to take every advantage of the facilities offered for testing this inoculation as a means of stamping out village outbreaks of cholera.

*Professor Haffkine's notes on a series of the Calcutta experiments referred to by Dr. Vaughan.*

Total number of inoculated 7,690 in the affected localities of the town.

From the beginning of operations (11th March 1894) cholera affected 77 households, of which 76 contain each partly inoculated and partly uninoculated members, and one contains inoculated members only.

In the 77 households there occurred 89 deaths—77 amongst the uninoculated members and 12 amongst the inoculated.

Of the houses with mixed (inoculated and uninoculated) inhabitants, there were six (with one death in each) in which the inoculated escaped, the disease being present only in a proportion under one-tenth to the uninoculated (who suffered). These houses are excluded from the calculations. The others show the following results:—

- I. During the first four days after inoculation—
  - 167 uninoculated, 6 deaths (3.59 per cent.) and three attacks with recovery.
  - 259 inoculated, 5 deaths (1.93 per cent.) and 1 attack with recovery.
  - Proportion of deaths in both groups as 1.86 to 1.
- II. During the year following the first four days—
  - 502 uninoculated, 42 deaths (8.37 per cent.) and 5 attacks with recovery.
  - 269 inoculated, 1 death (0.37 per cent.).
  - Proportion of deaths in both groups as 22.62 to 1.
- III. After the first year—
  - 238 uninoculated, 23 deaths (9.66 per cent.) and 3 attacks with recovery.
  - 96 inoculated, 6 deaths (6.25 per cent.).
  - Proportion of deaths in both groups as 1.55 to 1.

Of the six inoculated belonging to the last (III.) group, five had only the first—weak anti-cholera vaccine; the sixth was inoculated on the 3rd June 1894, before the observation made in July—August 1894 in the East Lancashire Regiment. No figures as yet available for the post Lucknow observations (with reference to the duration of immunity).

Without making an allowance for the four days, when the effect of inoculation is not yet complete, and considering the results as a whole, from the first day of inoculation in Calcutta (11th March 1894) up to end of last month, the results are—

654 uninoculated, 71 deaths (10.86 per cent.).

402 inoculated, 12 deaths (2.99 per cent.).

Proportion 3.63 to 1; reduction of mortality by 72.47 per cent., or for every 11 deaths amongst uninoculated members there were only three deaths amongst the inoculated.

RETURN OF ANTI-CHOLERAIC INOCULATIONS in BENGAL during 1896, exclusive of Calcutta and its Suburbs.

Places where Inoculations were carried on.	EUROPEANS.					HINDOOS.					MOHAMMEDANS.					OTHER CLASSES.					Grand Total.	Period for which inoculations were continued.	Results.	Remarks.		
	Adults.		Children under 12 years.		Total.	Adults.		Children under 12 years.		Total.	Adults.		Children under 12 years.		Total.	Adults.		Children under 12 years.		Total.						
	M.	F.	M.	F.		M.	F.	M.	F.		M.	F.	M.	F.		M.	F.	M.	F.						M.	F.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25.		
Purulia Coolie Depôts -	—	—	—	—	—	99	47	5	1	152	1	1	—	—	2	597	357	59	84	1,047	1,201	25th March to 1st April, 491; May, June, August to December, 710.	Vide table accompanying.	Besides these, 127 inoculations in Bankura Gool on 11th May 1896, 86 in Nadia district, 344 among railway employes in Kola, Midnapore, 759 in the district of Champaran and 2 in Muzaffarpur, total 1,318, of which details cannot be furnished, as the registers are not available.		
Purulia Town - -	—	—	—	—	—	—	—	—	—	—	5	2	1	—	8	4	—	—	—	4	12	9th May 1896				
Raniganj Coolie Depôts	—	—	—	—	—	2	4	1	—	7	—	—	—	—	—	49	6	3	2	60	67	2nd April „				
Ditto Paper Mills -	—	—	—	—	—	2	—	—	—	2	45	—	4	—	49	36	—	1	—	57	88	11th April „				
Serampore - -	—	—	—	—	—	57	25	45	26	158	98	1	17	5	121	1	1	1	2	5	270	21st to 29th March 1896				
Chaibassa - -	8	5	—	1	14	4	2	—	—	6	1	—	—	—	1	78	95	87	74	329	350	22nd to 25th May „				
Ranaghat - -	1	—	—	—	1	42	—	—	1	43	8	—	—	—	8	11	—	—	—	11	63	26th April „				
Darbhauga Jail -	2	—	—	—	2	65	2	—	—	67	22	—	—	—	22	31	—	1	—	32	123	11th April „				
Bankipore Jail -	—	—	—	—	—	4	—	—	—	4	15	—	—	—	15	79	15	—	—	94	113	31st May „				
Pertabganj Thana (Bhagalpur).	—	—	—	—	—	82	2	15	6	105	52	2	29	3	86	40	1	7	4	52	248	20th to 23rd April „				
Kandra, Bengal-Nagpur Railway.	1	—	—	—	1	9	—	—	—	9	9	—	—	—	9	7	—	—	—	7	26	16th May „				
Bangardah Village (Manbhum).	—	—	—	—	—	36	—	—	4	40	3	1	—	—	4	54	—	18	5	77	121	15th June „				
Gortopa „ „	—	—	—	—	—	32	—	11	3	46	6	—	6	—	12	3	—	—	—	3	61	8th July „				
Belindih „ „	—	—	—	—	—	58	—	43	16	117	1	—	—	1	2	33	—	29	3	65	184	25th and 26th July „				
Maroo „ „	—	—	—	—	—	15	—	4	—	19	1	—	—	—	1	—	—	—	—	—	20	27th July „				
Belma „ „	—	—	—	—	—	77	4	18	10	109	7	—	7	—	14	9	—	—	5	14	137	3rd August „				
Rudalporo Village (Champaran).	—	—	—	—	—	2	—	5	—	7	—	—	—	—	—	—	—	—	—	—	7	30th September „				
Grand Total -	12	5	—	1	18	586	86	147	67	886	274	7	64	9	354	1,027	475	206	129	1,837	3,095					

Table of Results of Anti-Choleraic Inoculations.

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Date.	Place where Inoculations were performed.	INCIDENCE OF CHOLERA PREVIOUS TO INOCULATION.						INCIDENCE OF CHOLERA SUBSEQUENT TO INOCULATIONS.										RATIOS OF INCIDENCE OF CHOLERA IN THE INOCULATED TO THAT IN THE UNINOCULATED POPULATION UNDER OBSERVATION SUBSEQUENT TO INOCULATION IN RESPECT OF—			INCREASE OR REDUCTION OF MORTALITY ON—		REMARKS.		
		Population under observation.	Number attacked.	Number died.	Percentage of—			AMONG INOCULATED PERSONS.					AMONG UNINOCULATED PERSONS.					Percentage of—			Whole population under observation.	Population attacked.			
					Attacks to population.	Deaths to population.	Deaths to attacks.	Population under observation.	Number attacked.	Number died.	Attacks to population.	Deaths to population.	Deaths to attacks.	Population under observation.	Number attacked.	Number died.	Attacks to population.	Deaths to population.	Deaths to attacks.	Attacks to population.				Deaths to population.	Deaths to attacks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
16th March 1896.	Bilaspur - -	264	14	10	5.3	3.7	71.4	150	2	1	1.03	0.67	50.0	100	5	5	5%	5%	100%	1 to 4.9	1 to 7.46	1 to 2	Decrease 86.6	50%	The 10 deaths in column 5 occurred the day before inoculation. Two cases specially referred to in report not included here. First vaccine only injected.
21st March 1896 to 29th March 1896.	Serampore - -	Cholera in town generally						27	2	1	7.4	3.7	50.0	51	2	1	38	1.9	50%	1 to 0.51	1 to 0.51	1 to 1	Increase 198.7%	Nil	First vaccine only used. Observations made within first two days after the inoculation.
	Ditto - -	Cholera in town generally						42	1	—	2.4	...	...	51	3	1	5.7	3.8	23.3%	1 to 2.32	0 to 3.8	0 to 33.3	Decrease 67.9	?	First vaccine only used. Observations made subsequent to first two days after inoculation.
11th April 1896	Darbhanga Jail -	234	14	10	5.9	4.3	71.4	110	5	3	4.5	2.7	60	99	11	11	11.1	11.1	100	1 to 2.4	1 to 4.1	1 to 1.7	75.7	51.1	Second vaccine used direct for the first time without previous use of first vaccine; first time inoculations done during epidemic.
11th May 1896	Bankura Jail -	Unrecorded						111	1	—	0.9	—	—	110	5	1	4.5	0.9	20	1 to 5	0 to 0.9	0 to 20	?	?	Second vaccine only used. Cases occurred between 2nd and 9th days, inclusive, after inoculation.
15th June 1896	Village of Bangurda (Manbhum).	350	78	60	22.2	17.1	61.2	121	—	—	—	—	169	13	3	7.6	1.7	23	0 to 7.6	0 to 1.7	0 to 23	?	?		
25th July 1896	Village of Bhelidih (Manbhum).	300	50	42	16.6	14	84	184	1	—	0.5	—	—	74	5	4	6.7	4.05	80	1 to 12.4	0 to 4.5	0 to 80	?	?	
26th July 1896 3rd August 1896	Village of Belma (Manbhum).	350	36	29	10.3	8.2	80.6	137	—	—	—	—	—	184	2	2	1.08	1.08	100	0 to 1.08	1 to 1.08	0 to 100	?	?	
TOTAL		498	192	151	12.9	1.08	78.6	882	12	5	1.3	0.56	41.6	838	46	28	5.5	3.3	60.8	1 to 4.2	1 to 5.9	1 to 1.5	83.1%	60.6%	

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## No. 2.

EXTRACT from the REPORT of the SANITARY COMMISSIONER with the  
GOVERNMENT of INDIA for 1897.

*Anti-Cholera Inoculation.*—Preventive inoculation against cholera was carried on in Bengal throughout the year, and 10,950 persons were operated on, mostly coolies on their way to the tea districts of Assam and Cachar.

No complete statistics regarding the efficacy of the inoculations have been obtained, but such facts as were recorded are in favour of inoculation.

Cholera was extraordinarily prevalent in 1897 among the coolies on their way to the labour districts in Assam and Cachar, and it is possible to compare roughly the mortality among the inoculated and uninoculated among the general body of immigrants on their way to the former. Confining the calculations to deaths which occurred between the ports of embarkation and the tea gardens, it appears that the general cholera death-rate was 16·7 per mille, and that the death-rate among inoculated coolies was 4·9 per mille. There are probably other circumstances besides inoculation to be taken into account; but it seems likely that, in the future, the data will be more complete, for the Chief Commissioner of Assam has prescribed a half-yearly return to be prepared by managers of tea gardens, in which will be shown the deaths from cholera on the gardens among uninoculated persons and among inoculated persons—(1) within six months; (2) between six and twelve months; (3) between one and two years; and (4) after two years from the date of inoculation.

It was stated that a large number of the men of the Shropshire Regiment, among whom there was a very severe outbreak of cholera at Sitapur in September, had been inoculated by M. Haffkine at Fort William in 1896. An examination of the medical history sheets, however, showed that if more had been inoculated, the operation was recorded in 27 cases only. The number of men at Sitapur when the epidemic began was 435; of these 65 were attacked and 41 died of cholera. Among the 27 inoculated men four were attacked and two died. So that among the uninoculated the percentage attacked was 14·9 and the case-mortality about 63 per cent., while among the inoculated the percentage attacked was 14·8 and the case-mortality 50 per cent.

Anti-cholera inoculation was carried out during the epidemics in the jails at Hazaribagh and Ranchi, but, although none of the inoculated were attacked, it does not seem that anything can be proved regarding the protective effect of the proceeding.

The medical officer of the jail at Ranchi found that of 335 inoculated 31·3 per cent. gained weight after the operation, 45·3 lost weight, and 23·3 neither lost nor gained.

## No. 3.

EXTRACT from the REPORT of the SANITARY COMMISSIONER with the  
GOVERNMENT of INDIA for 1898.

Anti-cholera inoculations were continued at the coolie depôt at Purulia in Bengal, but it is not possible to say how far the inoculation was protective as there are no complete statistics, the Chief Commissioner of Assam having decided that it would be inexpedient to prescribe for preparation by the managers of tea gardens, of the half-yearly returns to which allusion was made in the Report for 1897. If any conclusion is permissible from such figures as are available, it is decidedly in favour of the operation.

## INOCULATION AGAINST TYPHOID.

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No. 4.

LETTER from the GOVERNMENT of INDIA to the SECRETARY of STATE for  
INDIA, No. 98 (Military), dated Simla, the 25th May 1899.

IN our military despatch, No. 155, dated 11th November 1897, we addressed your Lordship on the subject of inoculation against enteric, a treatment strongly advocated by Dr. A. E. Wright, M.D., Professor of Pathology at the Army Medical School, at Netley, and we proposed that this system should be tried experimentally on such British officers and soldiers in this country, and about to embark for India, as might be willing to submit to the operation, Professor Wright's services being lent to us for four months to carry out the experiment.

2. Owing, however, to the diversity of opinion held at that time by the leading medical authorities regarding the value of Professor Wright's treatment, the Secretary of State for War was unable to assent to our proposal, and this decision was conveyed to us without comment in paragraph 28 of Military despatch, No. 23, dated India Office, the 3rd March 1898 (M. 1009).

3. Your Lordship's reply was communicated to the Principal Medical Officer, Her Majesty's Forces, in the usual manner, for the Commander-in-Chief's information, and it appears to have been understood from the concluding portion of the War Office letter of 24th January 1898, that the objection of Lord Lansdowne to the introduction of the treatment, applied rather to the formal authorisation of inoculation at the public expense, than to voluntary operations at private cost. Under this supposition, the latter have been carried out at certain stations (advantage being taken of the presence of Professor Wright in this country as a member of the Plague Commission) though without the sanction of the Government of India or of the Commander-in-Chief. On the facts becoming known, however, orders were issued to stop further inoculations and the treatment has accordingly been abandoned. The results of the inoculations have nevertheless been so satisfactory that His Excellency the Commander-in-Chief has strongly recommended, in a letter which we enclose, the adoption of the treatment in the interests of the health and efficiency of the British Army in India.

4. We regret our inability to furnish the actual numbers of those inoculated, together with the results, as no official records were kept; but this information could no doubt be obtained by a reference to Professor Wright, now in England. It is known, however, that over 2,000 men were inoculated, and that in no case did any bad or unfavourable symptoms follow the operation. Further, only a very few (five or six) of those inoculated contracted typhoid fever subsequently, and, with the exception of one case, the disease was of a mild character, while in two of the cases the disease was in the stage of incubation when the operation was performed.

5. The annual admissions per mille for enteric fever amongst British troops in India have risen from 18.5 in 1890 to 32.4 in 1897, while the death rate has increased from 4.91 to 9.01, and we are of opinion that every practicable means should be tried to guard against the ravages made by this disease. The anti-typhoid inoculations have been, we believe, on a sufficiently large scale to show the actual value of the treatment, while the results appear to afford satisfactory proof that the inoculation, when properly carried out, affords an immunity equal to, or greater than, that obtained by a person who has undergone an attack of the disease; further, the operation is one which does not cause any risk to health. In these circumstances, we are very strongly of opinion that a more extended trial should be made of the treatment, and we

trust that your Lordship will permit us to approve the inoculation, at the public expense, of all British officers and soldiers who may voluntarily submit themselves to the operation. We have already telegraphed to your Lordship to this effect.

We have, &c.

(Signed) CURZON OF KEDLESTON.  
W. S. A. LOCKHART.  
EDWIN H. H. COLLEN.  
C. M. RIVAZ.  
C. E. DAWKINS.  
T. RALEIGH.

*Enclosure in No. 4.*

From the Principal Medical Officer, Her Majesty's Forces in India, to the Secretary to the Government of India, Military Department,—(No. 1519 "Sanitary," dated Simla, the 4th April 1899).

With reference to Military Department No. 1562-D, dated 7th April 1898, forwarding copy of correspondence from the War Office, in which it is stated that the Secretary of State for War is unable to assent to the proposal to inoculate British officers and soldiers against typhoid fever, I have the honour, by direction of the Commander-in-Chief in India, to suggest that Her Majesty's Government be moved to re-consider its objection to the operation in question, on the grounds that it is one which most seriously affects the health and efficiency of the British Army in India.

(2.) The annual admission ratio per mille for enteric fever amongst British troops in India has risen from 18.5 in 1890 to 32.4 in 1897, while the death rate has increased from 4.91 to 9.01 respectively. Such a condition of things fully warrants, in the Commander-in-Chief's opinion, every precaution being taken to guard against the terrible ravages made by this disease.

(3.) From experiments which have been carefully made it has been conclusively proved to the satisfaction of those who are best competent to judge of the matter, that anti-typhoid inoculation, when properly carried out, achieves an immunity equal or greater to that which accrues to a person who undergoes and recovers from an attack of that disease.

(4.) Under these circumstances, and bearing in mind the extreme importance of the measure, and to the fact that the operation is one which does not cause any risk to health, I am to strongly recommend that the Government of India may be pleased to obtain sanction by *telegraph* to the inoculation of such British officers and soldiers who may voluntarily submit themselves to the operation.

No. 5.

LETTER from the GOVERNMENT of INDIA to the SECRETARY OF STATE for INDIA, No. 36 (Military), dated 8th March 1900.

EXTRACT.

Finally, we may touch on the two general measures for the prevention and cure of enteric fever to which we already have alluded. The circumstances connected with the experimental inoculation of soldiers, as advocated by Professor Wright, will be fresh in your Lordship's memory, and need not be recapitulated. Since receiving your approval of the resumption of inoculation at the public expense in August last, the measure has been widely resorted to, and we have hopes that the results will be satisfactory in securing some considerable degree of immunity, especially to young soldiers during the first years of their service. The employment of Major A. M. Davies, Royal Army Medical Corps, in special bacteriological research is also an experiment of recent date. This Officer has been so employed since the autumn of 1897; he has rendered very valuable service in the careful examination of water supplies at a number of cantonments, and in thoroughly investigating

the causes of disease at some of the most unhealthy stations in India, and suggesting necessary reforms. We propose shortly to extend the use of bacteriological research and to combine it more closely with the duties of the sanitary officers already mentioned.

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*Enclosure in No. 5.*

EXTRACT.

*Preventive Measures.*

The aim of all the measures that have been taken to combat enteric fever has been to shut off every possible or even probable source of infection, but the adoption of effective preventive measures is rendered difficult by the widespread character of the disease and the frequency of failure in tracing its source.

The object aimed at is to provide the soldier with pure air, pure water, and pure food, to give him healthy barracks to live in, and to take care that their neighbourhood is also kept in a satisfactory sanitary condition.

Bacteriology has come to our aid of late years, and has proved of immense value in helping to trace the origin of outbreaks of the disease, in determining the fitness or otherwise of sources of water-supply, and, lastly, it has placed in our hands what will probably in the future prove to be the most effectual preventive measure of all, namely, acquired immunity against enteric fever conferred by inoculation with anti-typhoid vaccine (Professor Wright's system). Our preventive measures are, therefore, based on—(1) excluding or killing the germs of the disease; (2) establishing immunity against it among susceptible individuals.

*Inoculation.*—With the short-service system it is manifestly impracticable to alter the age at which the British soldier arrives in India, although it is absolutely certain that many of the men in each fresh regiment or draft will fall victims to enteric fever.

When we further consider the facts that, in 1898, 71·41 per cent. of the admissions for enteric fever, and 73·39 per cent. of the deaths from it occurred among men between 20 and 25 years of age, that 44·5 per cent. of the admissions and 43 per cent. of the deaths from the disease occurred among men in their first year of service in the country, and that 51·41 per cent. of the total deaths from all causes were caused by enteric fever, the value of any method which will confer immunity against the disease is at once apparent. Anti-typhoid inoculation has already been practised to a small extent both at home and in India. Its object should be carefully explained to all the other younger men now serving in India with the view of inducing as many as possible to submit themselves voluntarily for inoculation. I would also suggest, as far as such a measure is practicable, that all soldiers, and particularly men under 25 years of age, coming to India for the first time, should be inoculated either before leaving England or on board ship.

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No. 6.

DESPATCH from the SECRETARY OF STATE FOR INDIA to the GOVERNMENT OF INDIA, No. 59 (Military), dated 10th May 1900.

EXTRACT.

I HAVE had under consideration the interesting report of the Principal Medical Officer, Her Majesty's Forces in India, on the prevalence of enteric fever among the British troops in India, and the measures which have been taken to combat it, with the remarks of your Government on the subject. I should be glad to be furnished with returns, as soon as there are sufficient data available, showing the comparative prevalence and intensity of the disease among inoculated and uninoculated soldiers.

[*In reply to your Military Despatch No. 36, dated 8th March 1900.*]

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EAST INDIA (INOCULATION AGAINST  
CHOLERA AND TYPHOID).

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RETURN of CORRESPONDENCE relating to  
PREVENTIVE INOCULATION against CHOLERA  
and TYPHOID in INDIA.

*(Sir Charles Cameron.)*

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*Ordered, by The House of Commons, to be Printed,  
11 July 1900.*

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*[Price 1½d.]*

EAST INDIA (DEATHS FROM PLAGUE, &c.).

RETURN to an Address of the Honourable The House of Commons,  
dated 23 April 1907;—for,

RETURN showing the NUMBER of DEATHS and the DEATH RATES per  
MILLION living in INDIA for each of the last 30 years from PLAGUE,  
CHOLERA, ENTERIC or TYPHOID FEVER, and SMALL POX respectively."

NOTE.—The Plague figures are furnished from the outbreak in 1896. No statistics  
are given for Enteric or Typhoid Fever, as these are not distinguished in the mortality  
returns.

India Office,  
30 May 1908. }

ARTHUR GODLEY,  
Under Secretary of State for India.

(*Sir William Collins.*)

*Ordered, by The House of Commons, to be Printed,*  
*2 June 1908.*

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Statement showing the number of deaths registered, with death rates per million of population, from Cholera and Small-pox in British India, in the years 1877 to 1906; and from Plague in the years 1896 to 1906.

Statement of deaths and the rates per million of population in British

No.	Province.	1877.				1878.				1879.			
		CHOLERA.		SMALL-POX.		CHOLERA.		SMALL-POX.		CHOLERA.		SMALL-POX.	
		Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.
1	Bengal†	155,805	2586.7	8,088	194.8	96,580	1609.0	12,410	266.9	137,549	2377.5	23,843	378.2
2	Assam	11,377	2989.7	1,260	331.1	6,782	1789.1	1,614	286.5	17,415	4300.3	1,418	378.8
3	United Provinces of Agra and Oudh.	81,770	748.6	36,023	843.1	23,221	520.1	170,524	3991.2	35,892	840.7	73,633	1728.9
4	Punjab	29	1.7	12,296	708.1	215	12.3	40,271	2302.9	26,135	1464.5	49,489	2830.0
5	North-West Frontier Province (a).	...	...	...	...	...	...	...	...	...	...	...	...
6	Central Provinces	3,418	461.4	2,768	373.6	40,965	5532.5	16,151	2190.2	27,575	3721.4	25,492	3440.8
7	Berar	842	885.8	6,580	2920.0	34,306	15701.1	5,850	2677.4	223	102.0	71	82.5
8	Madras	357,430	12236.7	88,821	8023.7	47,167	1614.8	56,380	1929.5	18,296	458.6	17,340	615.4
9	Coorg	•	•	•	•	49	291.1	•	•	•	•	71	431.8
10	Bombay	57,228	3536.6	27,369	1631.4	46,743	2883.6	4,475	276.5	6,937	427.5	1,156	71.2
11	Lower Burma	7,376	2479.1	1,230	419.1	6,759	2307.9	1,406	479.0	1,328	590.8	2,297	742.4
12	Upper Burma (b)	•	•	•	•	•	•	•	•	•	•	•	•
13	Ajmer-Merwara	•	•	•	•	40	100.9	•	•	31	53.0	•	•
	INDIA	624,675	3433.6	193,734	1009.9	301,747	1653.4	308,461	1690.2	266,871	1459.3	194,330	1062.6

No.	Province.	1882.				1884.				1885.			
		Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.
1	Bengal†	92,476	1689.8	9,714	146.0	136,698	2062.5	18,533	278.3	175,370	2633.3	9,863	148.1
2	Assam	14,908	3292.5	6,162	1880.9	22,276	4919.7	4,781	1055.9	7,758	1712.6	1,980	497.4
3	United Provinces of Agra and Oudh.	16,160	411.7	183,641	3149.2	30,143	688.4	202,541	4591.9	63,457	1439.7	14,503	330.8
4	Punjab	190	10.1	13,103	642.3	614	32.6	16,416	871.2	1,936	102.7	7,575	402.0
5	North-West Frontier Province (a).	...	...	...	...	...	...	...	...	...	...	...	...
6	Central Provinces	16,235	1841.3	4,696	532.6	749	16.9	3,882	538.7	21,888	2430.2	3,364	331.3
7	Berar	27,897	10607.2	3,853	1465.0	87	33.1	615	233.8	3,683	1400.4	259	96.1
8	Madras	36,284	1273.0	37,975	1833.3	75,478	2681.0	61,247	3175.6	58,109	2066.6	34,726	1235.0
9	Coorg	•	•	300	1682.5	•	•	108	505.7	•	•	240	1346.0
10	Bombay	87,954	2306.5	13,404	814.6	13,904	838.9	14,438	877.5	37,227	2386.1	2,643	160.8
11	Lower Burma	2,185	538.0	675	184.7	5,515	1599.5	6,102	1670.1	7,683	2103.4	2,120	530.2
12	Upper Burma (b)	•	•	•	•	•	•	•	•	•	•	•	•
13	Ajmer-Merwara	49	106.4	•	•	175	379.3	•	•	63	184.6	•	•
	INDIA	246,338	1264.8	227,523	1168.1	284,932	1465.5	326,063	1696.6	377,210	1940.5	77,866	398.0

No.	Province.	1889.				1890.				1891.			
		Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.
1	Bengal†	173,182	2585.5	8,665	180.1	146,848	2215.1	12,619	190.4	283,530	3272.8	16,193	227.9
2	Assam	18,288	4099.8	2,245	495.9	15,896	3401.0	1,401	309.5	23,882	4756.3	2,861	470.2
3	United Provinces of Agra and Oudh.	48,494	1099.4	42,243	1093.8	80,295	1820.4	55,394	1255.9	169,013	3603.8	28,355	561.9
4	Punjab	2,838	150.6	7,928	420.8	3,401	180.5	6,922	473.5	10,107	491.3	3,425	166.7
5	North-West Frontier Province (a).	...	...	...	...	...	...	...	...	...	...	...	...
6	Central Provinces	53,588	5964.8	17,529	1968.0	4,787	542.9	2,265	256.9	21,312	2243.0	748	78.7
7	Berar	10,925	4169.9	1,787	662.1	347	323.2	324	123.6	7,958	2601.7	34	12.0
8	Madras	76,020	2724.0	29,138	1044.1	35,228	1237.2	23,092	984.9	98,773	3464.1	41,322	1449.2
9	Coorg	9	50.5	19	108.6	5	13.0	34	130.7	7	40.4	478	2750.6
10	Bombay	82,431	1971.0	7,066	429.4	8,259	193.1	2,877	174.8	17,650	948.4	1,491	79.2
11	Lower Burma	3,242	837.3	2,812	769.6	1,076	294.5	3,693	1010.8	2,400	522.2	1,326	236.5
12	Upper Burma (b)	•	•	•	•	•	•	•	•	•	•	•	•
13	Ajmer-Merwara	50	108.5	•	•	408	885.8	•	•	532	980.9	•	•
	INDIA	417,067	2146.0	125,382	645.7	291,610	1499.5	115,921	694.5	584,364	2802.5	93,732	446.1

• Not available.

† Including Calcutta.

(a) Province created in 1901.

(b) Registration commenced in 1899.



India from Cholera, Small-pox and Plague (from 1896), during each of the years 1877 to 1906.

1880.				1881.				1882.				No.
CHOLERA.		SMALL-POX.		CHOLERA.		SMALL-POX.		CHOLERA.		SMALL-POX.		
Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	
40,448	670.6	22,953	350.5	80,873	1340.9	24,371	404.1	184,593	2774.2	13,651	205.2	1
2,808	738.8	2,239	590.2	5,010	1117.4	3,129	697.9	21,055	4695.9	3,195	712.6	2
71,546	1674.6	8,240	192.9	25,865	586.4	17,153	388.9	89,372	2026.2	26,628	603.7	3
274	15.7	9,145	523.0	5,207	297.8	6,749	385.9	39	2.1	6,379	888.5	4
...	...	...	...	...	...	...	...	...	...	...	...	5
330	44.5	5,184	699.6	9,140	1233.5	1,816	245.1	11,932	1855.6	3,945	448.3	6
1	.5	39	17.8	3,404	1294.3	225	85.6	3,573	1858.5	369	140.3	7
613	21.3	14,529	504.9	9,446	329.4	15,776	550.1	23,304	817.1	20,159	697.9	8
...	...	29	172.3	3	16.8	68	353.3	81	178.9	465	2607.9	9
...	...	940	57.0	16,694	1014.3	539	32.8	7,904	480.4	1,630	99.1	10
2,638	847.0	5,402	1734.5	5,239	1418.9	1,766	478.3	7,177	1958.8	770	210.2	11
...	...	...	...	...	...	...	...	...	...	...	...	12
...	...	...	...	...	...	...	...	...	...	...	...	13
119,337	654.9	68,700	377.0	160,881	867.6	71,587	366.6	349,279	1795.0	77,191	396.7	
1886.				1887.				1888.				No.
Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	
120,109	1803.5	4,049	60.8	173,776	2609.4	3,846	57.8	113,125	1608.7	6,247	93.8	
20,188	4459.5	584	124.6	7,941	1754.2	1,162	256.7	9,693	2141.2	2,059	454.8	2
84,585	783.6	10,486	287.7	200,628	4548.6	8,492	192.5	18,704	424.1	25,000	566.8	3
12	.6	10,770	571.6	8,804	467.2	16,382	869.4	14,938	792.8	10,938	898.9	4
...	...	...	...	...	...	...	...	...	...	...	...	5
16,679	1891.6	2,774	314.6	12,576	1426.3	3,368	382.0	921	104.5	10,729	1216.8	6
976	371.1	116	44.1	14,396	5473.7	311	118.3	805	116.4	317	311.8	7
12,417	443.8	17,129	610.8	28,359	1011.2	21,472	765.7	58,677	2102.5	21,858	783.2	8
...	...	43	241.2	3	16.8	133	745.9	2	11.2	62	370.2	9
167	10.1	876	53.2	25,711	1562.6	3,753	228.1	36,500	2218.2	3,617	219.8	10
4,027	1102.2	115	81.5	2,649	725.0	223	62.4	15,982	4374.3	571	156.3	11
...	...	...	...	...	...	...	...	...	...	...	...	12
116	251.8	...	...	205	445.0	...	...	13	28.2	...	...	13
209,256	1076.9	46,922	241.6	475,048	2444.8	59,147	304.4	269,860	1384.7	87,902	452.1	
1892.				1893.				1894.				No.
Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	
261,417	3678.3	22,359	314.6	126,976	1786.6	14,531	204.5	236,150	3322.3	3,404	118.2	
21,552	4292.3	1,452	289.2	21,840	4351.5	2,643	526.4	19,497	2688.1	3,997	796.0	2
194,886	4154.9	7,709	164.4	12,154	259.1	5,992	127.7	178,079	3799.6	4,443	94.7	3
75,959	3695.6	11,173	543.6	639	31.1	4,085	196.7	113	5.5	6,068	295.2	4
...	...	...	...	...	...	...	...	...	...	...	...	5
39,972	4207.0	995	104.7	557	58.6	1,602	168.6	7,043	741.3	1,500	157.9	6
2,030	714.0	68	23.9	1,188	417.8	174	61.2	3,452	1214.1	1,061	378.2	7
79,033	2345.7	43,757	1288.7	32,209	956.0	27,239	809.9	42,289	1255.1	11,207	332.6	8
58	335.2	918	5375.8	9	32.0	214	1236.6	8	46.2	37	218.8	9
42,900	2279.4	2,770	147.2	18,653	1001.7	3,537	189.5	33,588	1794.7	3,155	167.6	10
6,208	1375.7	1,463	321.2	2,393	530.3	3,081	682.7	7,438	1644.6	1,737	384.6	11
...	...	...	...	...	...	...	...	...	...	...	...	12
2,353	4336.6	...	...	3	5.5	...	...	...	...	437	805.7	13
726,367	3400.0	92,659	433.7	216,830	1015.0	63,178	295.7	521,647	2441.7	42,046	196.8	

## Statement of deaths and the rates per million of population in British

No.	Province.	1895.				1896.				1897.							
		CHOLERA.		SMALL-POX.		CHOLERA.		SMALL-POX.		PLAGUE.		CHOLERA.		SMALL-POX.		PLAGUE.	
		Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.
1	Bengal   ...	177,087	2491.7	13,020	183.2	226,824	3191.5	13,388	188.4	...	...	196,247	2761.3	19,655	276.6	...	...
2	Assam ...	18,062	3776.5	3,849	766.6	17,042	3394.1	5,444	1084.2	...	...	83,240	6620.1	5,430	1079.4	...	...
3	United Provinces of Agra and Oudh.	51,562	1099.3	1,968	42.0	69,147	1474.2	42,771	911.9	...	...	44,208	943.5	87,127	1857.5	72	1.5
4	Punjab ...	549	26.7	8,334	405.5	5,146	250.4	45,084	2193.4	...	...	622	30.3	16,077	782.2	179	6.7
5	North-West Frontier Province. (a)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	Central Provinces	15,506	1632.0	6,644	693.3	52,985	5576.5	7,747	815.4	...	...	57,191	6012.9	3,641	383.2	11	1.2
7	Berar ...	11,919	4192.1	556	195.6	12,264	4813.4	810	384.9	...	...	10,122	3548.1	617	216.3	...	...
8	Madras ...	21,172	630.8	5,111	132.3	47,847	1462.3	9,410	287.6	...	...	143,445	4490.4	21,678	635.5	...	...
9	Coorg ...	...	...	7	40.4	49	283.1	18	104.0	...	...	106	612.5	59	340.9	...	...
10	Bombay ...	8,890	472.4	2,299	122.2	35,404	1881.2	6,443	842.3	2,219	117.9	57,109	8034.4	3,835	203.8	47,710	2535.0
11	Lower Burma ...	5,150	1140.2	1,540	311.0	2,959	655.4	1,669	369.7	...	...	8,538	1891.1	1,950	431.9	...	...
12	Upper Burma (b) ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13	Ajmer-Merwara ...	289	532.9	754	1390.2	12	22.1	3,621	7045.2	...	...	19	35.0	158	291.3	...	...
	INDIA ...	311,086	1467.0	44,082	206.5	469,679	3208.5	136,606	642.3	2,219	10.4	550,787	2691.3	160,217	753.8	47,974	225.7

  

No.	Province.	1901.						1902.						1903.					
		CHOLERA.		SMALL-POX.		PLAGUE.		CHOLERA.		SMALL-POX.		PLAGUE.		CHOLERA.		SMALL-POX.		PLAGUE.	
		Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.
1	Bengal   ...	110,753	1483.1	37,680	506.3	78,629	1056.4	150,971	2023.4	57,430	771.6	32,967	442.9	203,405	2732.9	30,459	409.2	65,680	882.5
2	Assam ...	7,468	1415.5	3,274	620.6	...	...	12,658	2399.3	6,573	1264.9	...	...	8,360	1584.6	1,111	210.6	28	5.3
3	United Provinces of Agra and Oudh.	53,935	1132.2	981	20.6	9,778	205.0	25,160	527.6	4,976	104.3	43,487	911.8	47,159	988.8	21,950	460.3	80,729	1692.7
4	Punjab ...	180	9.0	6,154	306.0	10,720	831.4	371	18.4	11,629	578.3	175,645	8734.8	14,688	730.4	15,635	777.5	192,068	9551.5
5	North-West Frontier Province (a)	117	57.2	955	466.7	...	...	...	...	1,081	543.0	4	2.0	1,854	680.1	2,694	1353.3	49	24.6
6	Central Provinces.	49	5.0	5,681	585.0	9	9.0	23	2.9	4,234	433.3	459	47.0	5437	35.0	2,130	170.5	51,514	4123.8
7	Berar ...	17	6.3	190	69.9	...	...	16	5.9	327	120.2	4,188	1538.9	...	...	...	...	...	...
8	Madras ...	61,370	2130.6	20,202	702.2	3,035	81.3	29,769	820.3	24,967	638.0	11,362	313.1	27,393	734.1	15,015	402.4	13,006	348.5
9	Coorg ...	58	321.1	449	2486.1	...	...	...	...	19	105.2	...	...	...	...	43	238.1	45	249.2
10	Bombay ...	13,600	735.9	5,840	288.9	128,259	6939.9	3,230	174.6	2,189	118.4	164,752	9996.7	1,825	98.7	2,732	147.8	281,269	13319.1
11	Lower Burma.	3,552	640.4	2,468	445.0	3	5.0	1,844	332.5	1,565	282.2	...	...	5,346	971.5	1,266	230.1	9	1.6
12	Upper Burma (b).	1	3.3	...	...	...	...	57	19.7	850	121.3	...	...	2,887	1000.1	654	236.6	...	...
13	Ajmer-Merwara.	50	104.8	4	8.4	...	...	32	67.1	3	6.3	1	2.1	...	...	4	8.4	48	100.6
	INDIA ...	271,210	1209.2	89,378	898.5	236,433	1054.2	224,136	992.4	115,443	511.1	452,665	2005.2	312,654	1379.2	93,693	413.1	684,445	3017.4

(a) Province created in 1901.  
(b) Registration commenced in 1899.  
|| Including Calcutta.

• Not available.  
† Eastern Bengal and Assam.  
‡ Central Provinces and Berar.

India from Vera, Small-pox and Plague (from 1896), during each of the years 1877 to 1906—concluded.

1898.						1899.						1900.						No.	
CHOLERA.		SMALL-POX.		PLAGUE.		CHOLERA.		SMALL-POX.		PLAGUE.		CHOLERA.		SMALL-POX.		PLAGUE.			
Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.		
65,020	914.9	14,269	200.8	219	3.1	107,678	1515.1	13,116	184.6	3,264	45.9	945,878	4866.7	20,620	290.1	38,413	540.5	1	
11,149	2320.4	5,199	1035.4	...	...	8,380	1659.2	1,565	309.9	...	...	23,761	4504.2	975	184.4	...	...	2	
2,508	53.5	2,419	51.6	148	3.2	8,142	173.6	2,096	44.7	7	1	84,960	1811.3	1,410	30.1	135	2.9	3	
83	1.6	4,998	243.2	2,019	98.2	1,816	88.4	5,149	250.5	255	12.4	28,260	1374.9	10,425	507.2	572	27.8	4	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
7	7	926	97.5	131	13.8	76	8.0	1,064	112.0	584	61.5	63,114	6648.6	7,005	737.3	580	62.1	6	
...	...	592	207.5	...	...	541	189.6	305	106.9	2	7	18,375	6441.0	830	290.9	2	7	7	
85,4	965.3	20,490	618.3	557	16.8	29,082	867.5	16,991	506.8	1,658	49.5	60,662	1837.9	27,692	839.0	664	20.1	8	
8	46.2	22	127.1	...	...	...	...	28	161.8	...	...	...	...	314	1814.5	...	...	9	
4,368	232.1	1,834	97.4	86,191	4579.7	8,579	455.9	1,946	103.4	96,596	5132.5	163,889	8708.1	9,885	525.2	83,196	1763.8	10	
2,972	658.9	4,826	1069.9	...	...	4,942	1101.1	5,891	1320.5	2	4	3,440	771.1	3,014	675.6	3	7	11	
...	...	...	...	...	...	2,050	835.3	1,220	497.1	...	...	41	16.7	2,789	1183.4	...	...	12	
1	1.8	409	754.1	...	...	1	1.8	963	1773.7	1	1.8	4,842	8927.7	2,610	4812.3	2	3.7	13	
161,610	710.7	66,984	262.6	89,265	418.7	171,267	798.9	50,333	238.1	102,369	474.1	797,222	3697.4	87,569	406.1	78,576	341.2		
1904.						1905.						1906.						No.	
CHOLERA.		SMALL-POX.		PLAGUE.		CHOLERA.		SMALL-POX.		PLAGUE.		CHOLERA.		SMALL-POX.		PLAGUE.			
Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.	Deaths.	Ratio per 1,000,000 of population.		
187,701	1850.1	17,330	232.8	75,436	1013.5	146,339	2933.2	7,213	144.6	126,084	2527.2	192,596	3811.7	23,206	439.5	59,619	1179.9		
5,588	1059.2	1,559	395.5	...	...	142,912	4773.5	4,723	158.4	61	2.1	108,278	3631.9	6,972	233.7	741	25.1		
6,617	138.7	6,998	146.7	179,082	3755.0	121,790	2553.7	8,273	63.6	383,802	8047.5	149,549	3135.7	13,202	276.8	69,660	1460.6		
716	35.6	9,624	478.6	896,357	19710.7	2,197	109.3	4,723	234.0	394,897	16854.9	4,293	210.5	13,239	658.4	91,712	4560.8		
1	5	1,561	784.1	1	5	300	150.7	571	286.8	3	1.5	...	...	1,127	566.1	41	20.6		
2,967	287.5	2,026	162.2	42,866	3431.5	1,217	102.4	8,364	703.6	12,706	1068.8	88,768	3262.1	9,889	882.1	18,121	1524.8	7	
23,109	629.8	9,891	269.6	20,125	548.5	10,888	459.7	18,540	504.7	5,788	157.6	142,811	3914.3	29,840	817.9	698	24.6	8	
...	...	16	88.8	25	188.4	...	...	132	730.9	...	...	10	55.4	234	1295.6	...	...	9	
13,156	711.9	4,289	232.1	223,957	12116.0	5,396	292.0	16,985	919.0	71,363	3861.3	46,119	2495.4	4,063	219.3	51,535	2787.9	10	
2,472	449.2	1,311	238.2	3	5	3,511	630.5	5,623	1009.8	3,045	546.8	5,529	992.9	7,903	1419.2	5,223	936.0	11	
508	170.6	498	167.2	...	...	1,836	629.3	538	184.4	647	291.8	2,343	803.1	637	218.3	3,414	1170.2	12	
...	...	129	370.5	158	331.3	...	...	277	580.8	2,480	5200.1	284	595.5	271	568.2	68	142.6	13	
192,835	862.1	55,232	244.1	938,010	4145.0	441,786	1957.0	70,982	314.3	940,821	4167.6	690,619	3053.7	109,583	484.6	300,355	1328.2		