Report on the recent epidemic of measles in Brighton, with a discussion of the possibility of the employment of further measures for preventing the high mortality from this disease / by Arthur Newsholme.

REPORT ON THE RECENT EPIDEMIC OF MEASLES IN BRIGHTON,

With a Discussion of the Possibility of the Employment of Further Measures for Preventing the High Mortality from this Disease.

BY

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During 1892 Brighton suffered severely from Measles. In the first quarter of the year no deaths were recorded from this disease; during the second quarter the number of deaths registered as due to this disease was 5; during the third quarter 13; and during the fourth quarter of the year 99. The total number of deaths from Measles during the year was 117. This number had only been exceeded in 1882, in which 178 deaths, and in 1883, in which 138 deaths from Measles were registered.

The following report deals with the circumstances under which these deaths occurred; the preventive measures which were taken with indifferent success; the causes of this indifferent success; and the lines upon which, if any, greater success may be hoped for in the future.

Dealing with the first point, we may first consider the *incidence as to age* of the deaths from Measles.

A glance at Table I. will shew that of the total deaths 84·6 per cent. occurred under three years of age, while in the epidemic of 1882 only 65·4 per cent. of the deaths were at ages under three. It is difficult to find an explanation for the increase in 1892 in the proportion of the deaths from Measles under three years to total deaths from this cause, though it probably indicates a somewhat more severe type of disease.

Were we able to state the total number of cases of Measles in the two years 1882 and 1892, the number of deaths per 100 cases (case-mortality) and therefore the relative severity of the disease in the two years might at once be stated. In the absence of compulsory notification of Measles, this is of course impossible.

Failing this, information as to the *duration of the illness in fatal cases* may throw some light on the question. In Tables II. and III. I have classified all the available data on this point. The last great epidemic was in 1882, but unfortunately at that date the day of disease on which death occurred was not so accurately stated as during the last three years. There is a tendency (on the inspection sheets) for aggregation of fatal cases on the seventh, fourteenth and twenty-first days, and for this reason I have arranged all the figures in groups of six days. It is doubtful if even after this has been done complete reliance can be placed on the figures for 1882. The deaths from Measles during 1890 and 1891 (60 and 27 respectively) have been grouped together. The varying number of deaths in which the date of death was not stated causes a further difficulty; but notwithstanding these essential weaknesses of the figures, Table III. enables us to draw some very useful deductions.

Thus, in 1882, 45·5 per cent. of the total deaths from Measles occurred during the first twelve days, as compared with 61·0 per cent. in 1890-91, and with 62·4 per cent. in 1892. It is evident that if these figures are to be trusted, Measles kills at an earlier date than it formerly did. (I state this conclusion with reserve, owing to the doubt as to the precision of the figures for 1882.) There is a slightly greater tendency to early death in the great epidemic of 1892 than in the minor epidemic of 1890-1.

The earlier date of death in 1892 must be connected with the fact shewn in Table I., that 84·6 per cent. of the fatal cases were in children under three years of age, as compared with only 65·4 per cent. in 1882. There can be little doubt that

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assuming increased malignancy of Measles, the weight of this increased malignancy would show itself to a disproportionate extent among children of a very tender age.

Having stated the age of patients and the duration of the illness in fatal cases, we may next inquire the total effect of Measles on the general death-rate during the fourth quarter of 1892. The following diagram enables this to be seen at a glance. The total height of the vertical columns shews the total death-rate for each week; the upper portion of the specially marked column the proportion of the death-rate due to Measles, and the lower portion of the specially marked column the relatively insignificant proportion of the total death-rate caused by all other zymotic diseases.

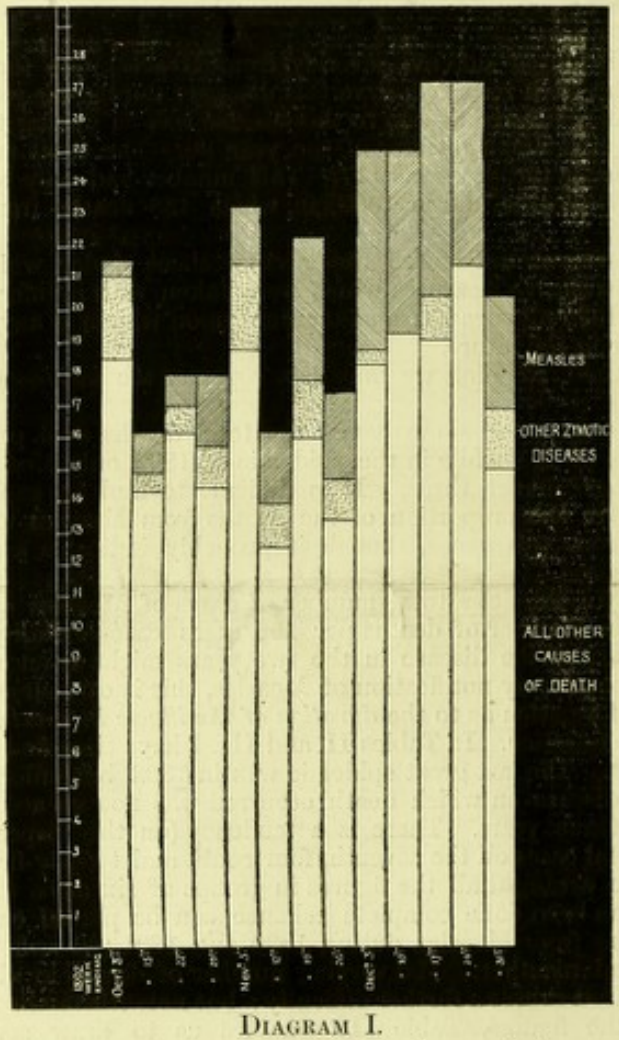

DIAGRAM I.

Shewing death-rate from All Causes, from Measles, and from all other Zymotic Diseases during each week of the fourth quarter of 1892.

The importance of dealing with a disease which is capable, at intervals, of raising our local rate of mortality to such an abnormal extent is evident; and if any practicable means are available, it is incumbent upon me, as the adviser of the Local Authority in matters relating to health, to state them.

The importance of Measles in raising the death rate may be further seen by a glance at Diagram II., which shows the relative rates of mortality from each of the more important infectious diseases in Brighton for a series of years. I must draw attention to several important points in this diagram.

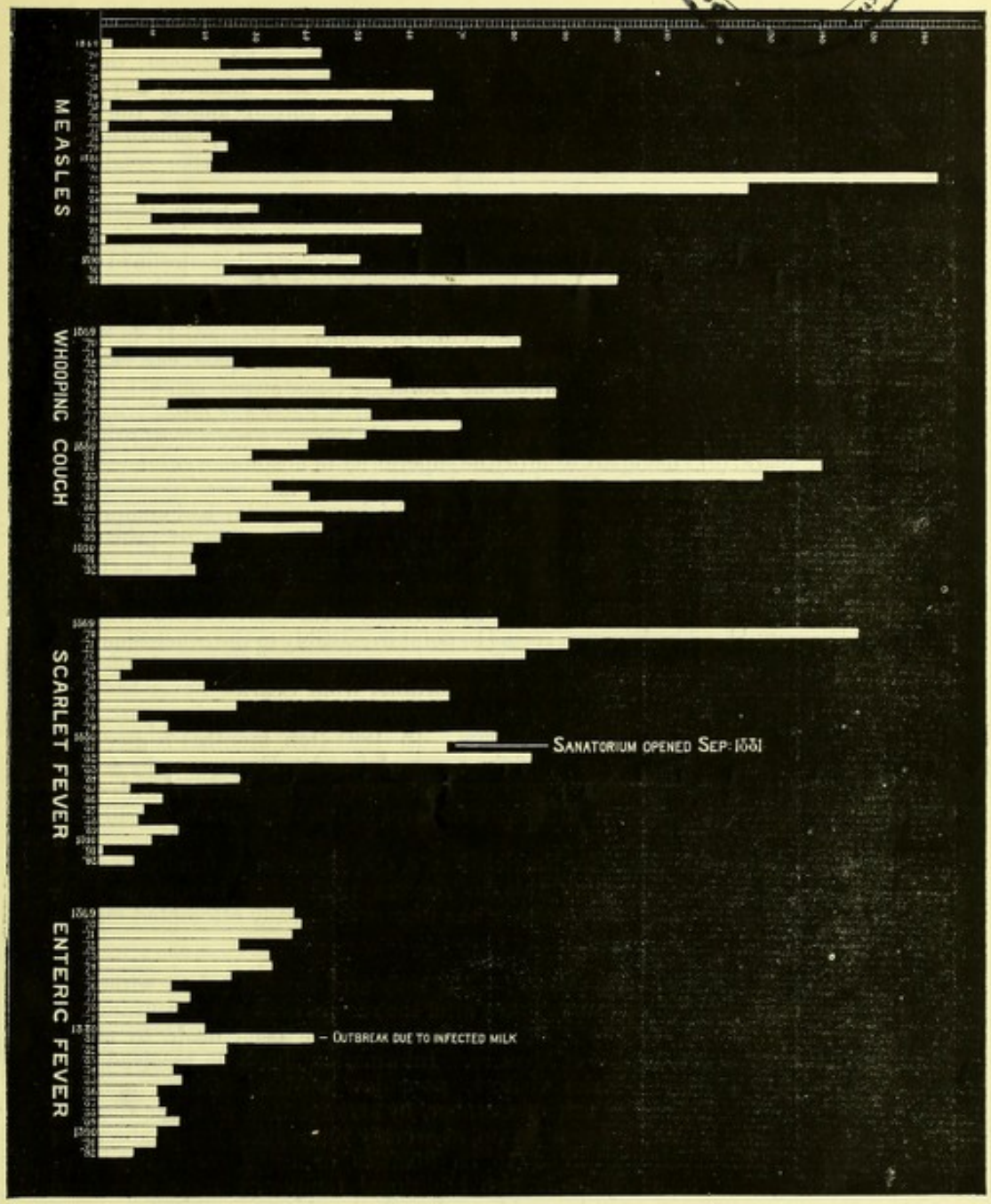

DIAGRAM II.

Shewing the annual death-rates from Measles, Whooping Cough, Scarlet Fever, and Enteric Fever for each year from 1869 *to* 1892 *inclusive.*

It will be seen that Measles and Whooping Cough together cause a much higher mortality than Scarlet Fever and Enteric Fever together. Measles occurs in an epidemic form every second or third year, while at longer intervals epidemics of a more severe type occur. One of these occurred in 1882-3, and we have recently suffered from a second of the same kind. There is, however, no evidence on the whole of any decline in its prevalence or fatality, looking at the whole series of

years, but rather of some increase. It should be stated here that no evidence exists that Measles is spread in any other way than by personal infection; there is not the slightest reason for connecting its origin with defective drains or any other insanitary conditions; though it is much more easily spread among the poor through conditions of overcrowding and dense aggregation of population, and among them is also much more prone to be fatal owing to unfavourable conditions of nursing.

On looking at the columns for Typhoid Fever and Scarlet Fever there is a marked contrast. Typhoid Fever, if we except the year 1881, in which an outbreak due to an infected milk supply occurred, has steadily declined with improvements in main sewerage and house drainage, and with the abolition of cesspools.

Scarlet Fever again shows a remarkable decline in fatality. Diagram II. indicates that at intervals of not more than three years, this disease in the past has assumed epidemic proportions. Since 1882, when the Borough Sanatorium came into full operation, *the usual periodical rise in mortality from Scarlet Fever has failed to appear.* It may be admitted: (*a*) That Scarlet Fever has probably become a considerably milder disease of late years; (*b*) That apart from (*a*) the superiority of hospital over home treatment of this disease is so great that the number of deaths has been lowered to a greater extent than the number of cases.* As, in Brighton, we have had compulsory notification of Scarlet Fever only since March, 1891, it is impossible to prove how far the diminished virulence of the disease is the cause of this lowered mortality. I am strongly of opinion, however, that this does not account to more than a small extent for the striking and continuous fall in mortality from Scarlet Fever which is shown in Diagram II. The Diagram seems to point irresistibly to the conclusion that, with the increasing use of the Borough Sanatorium, the possibilities of infection have been reduced, and consequently the mortality from Scarlet Fever has been lowered. I know of no factor competent to have produced this result, apart from the isolation of patients at the Sanatorium. In 1891 (ten months) 70 per cent. of the cases, and in 1892 72 per cent. of the cases of Scarlet Fever were removed to the Sanatorium. The remaining cases were all such as were isolated with a fair degree of efficiency at home, as otherwise removal to the Sanatorium would have been pressed.

With such a favourable result for Scarlet Fever, the question naturally suggests itself, whether results approaching this in success might not be obtained for Measles? Before answering this question, the measures already attempted may be stated.

Summary of measures already adopted.—No measures can be taken without a knowledge of the cases, and measures taken after the receipt of death certificates can evidently be of little use. Every endeavour has therefore been made to obtain voluntary information of all cases of Measles. Information has been received from school attendance officers, district visitors, poor law medical officers, and the public dispensaries Since the 8th of October, by arrangement with the Clerk of the School Board, each teacher has filled up, at weekly intervals, a list of absentees whose cause of absence is suspected to be Measles or some other infectious disease. During the recent epidemic two additional temporary inspectors were employed to visit cases of Measles. Altogether during last year 1,276 cases of Measles came to our knowledge, viz.:—

776	houses	having	one	case	in	each house.
136	,,	,,	two	cases	,,	,,
51	,,	,,	three	,,	,,	,,
12	,,	,,	four	,,	,,	,,
3	,,	,,	five	,,	,,	,,
2	,,	,,	six	,,	,,	,,

* During 1892, of 382 cases of Scarlet Fever, 276 were treated at the Sanatorium and 4 in other Hospitals, with a mortality of 1·78 per cent.; 102 were treated at home, with a mortality of 1·96 per cent.

Now the number of deaths from Measles during last year was 117. This would represent an apparent mortality of 9·2 per cent. What the real mortality was is somewhat doubtful. If we assume the case-mortality to be 3·1 per cent., as in Edinburgh during ten years, then the total number of cases in Brighton last year was 3,770, of which 2,494 escaped notice.

This being the case, it is not surprising that the visits twice a week to houses where Measles was known to exist, to ensure that the affected children were kept indoors for a period of three weeks, and the subsequent disinfection, were but partially successful.

In addition to the measures already named, after the first visit to each case of Measles, a letter was sent to the head teacher of the school attended by the child, stating the length of time during which the latter must remain at home; and the head teachers of the senior departments in each school were instructed not to admit to school any other children from the same house during the three weeks of infection. It is only right to state that these instructions have been loyally carried out by the teachers of the town, though the full benefit of this important measure has not been secured, *owing to our being ignorant of about* 66 *per cent. of the cases.*

The infants' department of eleven schools were closed in consequence of the severe incidence of Measles on these schools. I could not however satisfy myself that this measure was productive of much good. Owing to the meagre character of the information received and the delay in its reception, the disease had obtained a complete hold on each school before closure was effected. Several Sunday Schools were also kept closed at my request.

No hospital isolation was attempted during the recent epidemic of Measles, the available accommodation at the Sanatorium being in use for scarlet fever, &c.

Summary of other Measures practicable for Measles.—The essential preliminary to any attempt to combat this highly infectious disease is to add it to the list of diseases already compulsorily notifiable under the Infectious Diseases (Notification) Act. With such notification, removal to the hospital or isolation at home, prevention of attendance of children from the infected house at school, occasional closure of schools, and disinfection after each case of the disease could be efficiently and completely carried out.

Cost of Notification of Measles.—Assuming that there were 3,770 cases of Measles in Brighton last year, then if a fee of 2s. 6d. were paid for each case notified, the total cost during 1892 would have been £471, as compared with £65 for all other notified diseases during the same year. The sum of £471 is, however a very extravagant estimate even for a year of such maximum prevalence of Measles as 1892. *(a)* For in the first place, if we may judge from the facts for the month of December (for which alone I have the information), 46 per cent. of the cases of Measles were unattended by any doctor, and the onus of notifying in such cases would fall on the householder, who does not receive any fee for discharging this public duty. *(b)* In the next place, even of those cases attended by doctors, if we may judge again by the month of December, one half are attended by parochial or dispensary medical officers, to whom a fee of only one shilling is payable. Thus the amount actually payable during 1892 would probably not have been more than £120. If we give the maximum amount as £200, we have, I believe, an excessive estimate of the possible cost of notification of Measles during the worst epidemic years. During 1891 the amount payable for the notification of Measles (calculated on the above excessive basis) would have been £46, and the payment of this sum and the measures which would have followed the receipt of the notification certificates would probably have prevented the necessity for a considerable proportion of the estimated amount (£200) for 1892.

If, however, by an expenditure of £200, or even of £471, a considerable proportion of the 117 deaths occurring last year from Measles in Brighton could have been averted, there would, I believe, be not the slightest hesitation on your part in extending compulsory notification to Measles. Is there then sufficient reason to hope for this to justify the making of this experiment?

Notification alone is valueless. It is a means to an end; the end being the isolation of the infectious sick and the prevention of the spread of disease.

Is isolation practicable for Measles?—There are many difficulties in the way.

(*a*). Measles attacks children of tender years, thus increasing the difficulties of hospital treatment. Judging however by our experience of Scarlet Fever, there is but little difficulty in persuading mothers to allow their children, aged 1 to 3 years, to be removed to the Sanatorium.

(*b*). Measles is infectious from the onset of the first catarrhal symptoms, for 72 hours before the appearance of the characteristic rash, and during this time other children may have become infected. Hence there is less certainty of preventing the spread to other children than in Scarlet Fever, in which the characteristic rash appears within 12 hours. But Measles continues infectious for a further 14 or 18 days, and it is surely an insufficient reason for doing nothing during this period, that we have been able to do nothing for the first three days.

(*c*). It is urged that only hospital accommodation on a gigantic scale would suffice for an epidemic disease like Measles, which so rapidly assumes such enormous proportions. This argument appears to beg the very point at issue. The rapid spread of measles is, in fact, always preceded by a number of sporadic cases, just as a heavy shower is preceded by drops of rain. I have made careful inquiries as to the mode of procedure in some of the towns in which Measles is already compulsorily notified. It must be admitted that in most of these the notification of Measles has been of little, if any, service. But I do not know of any town in which a prompt and persistent attempt has been made to *secure the isolation*, either in hospital or at home, *of every notified case of Measles during the periods in which odd cases occur, in the intervals of an epidemic.* It is perfectly true that the number of cases of Measles in an epidemic is so great that no reasonable amount of hospital accommodation would suffice. But would epidemics of so great a magnitude occur if the isolation of early cases was insisted upon?

(*d*). It is not improbable that for several years householders would fail to comply with the requirements of the Act, and that thus many cases would escape notification. There is little doubt that this cause would prevent compulsory notification of Measles being completely successful for many years to come. This very fact, however, forms a strong argument in favour of immediate notification. If householders require to be educated on this point, then, in the interests of the town, the process of education should be started with all possible promptitude.

(*e*) It is also commonly stated that a large proportion of deaths from Measles occur after three or four weeks, and that hospital isolation or careful home nursing would not prevent these deaths. Table III. shews, however, that 78·6 per cent. (at least) of the deaths occur within the first eighteen days, and that proper treatment during this time would remove the greater portion of the danger.

Another point is noteworthy. The hospital treatment of Measles patients would not average more than 21 days, while that of Scarlet Fever averages about 54 days. It is evident, therefore, that in a given period two-and-a-half times as many patients with Measles can be treated as with Scarlet Fever.

I have frankly stated the chief difficulties in the way of notification of Measles as a means of preventing its spread. The chief advantages of such notification are as follows:—

(*a*). In inter-epidemic periods the isolation of cases of Measles could be enforced, with an increased probability of preventing, or at least mitigating, the wide-spread epidemics at biennial or triennial intervals.

(*b*). In epidemic periods, although it would be impossible to remove every case to the Sanatorium, the most severe cases could be so removed, and thus *the case-mortality greatly reduced.* The more efficient nursing at the Sanatorium

under more favourable conditions than can be secured in the homes of the poor would greatly reduce the mortality from this disease. During the recent epidemic there would have been no difficulty (had accommodation been available) in removing a considerable proportion of the cases, and the Guardians of the poor have expressed their anxiety that the cases of this disease coming under their care should all be removed to the Sanatorium at their cost. Their cases form a very high proportion of the total number.

I do not lose sight of the fact that this implies additional accommodation at the Sanatorium. This has already received your attention, and the Borough Surveyor is preparing plans for your consideration. Before the next epidemic of Measles is due this additional accommodation will probably be ready, and I do not think, therefore, that it would be wise to postpone the inclusion of Measles in the list of notifiable diseases.

To sum up: I recommend the inclusion of Measles in the list of diseases to be notified, and that all cases not properly isolated at home be treated at the Borough Sanatorium, so far as the accommodation allows of this. The notification of Measles has been a partial failure in most of the towns in which it has been adopted; but this failure has arisen, I believe, from the fact that no town has grappled with the hospital treatment of this disease. I hope that Brighton will lead the way in the hospital treatment of Measles. The experiment which I suggest is one of great value; it will, I believe, be to the benefit of Brighton. Should, however, the experience of a series of years prove, contrary to my expectations, that the notification of Measles is valueless, it can after due notice be abandoned.

TABLE I.

Age Incidence of Deaths from Measles.

AGE.	1882.		1892.	
	NUMBER OF DEATHS.	PER CENT. OF TOTAL DEATHS FROM MEASLES.	NUMBER OF DEATHS.	PER CENT. OF TOTAL DEATHS FROM MEASLES.
Under 1 ...	19	15·7	26	22·2
1 and under 2	36	29·8 } 65·4	46	39·3 } 84·6
2 „ „ 3	24	19·9	27	23·1
3 „ „ 4	24	19·9 } 30·6	11	9·4 } 12·0
4 „ „ 5	13	10·7	3	2·6
5 „ „ 6	3	2·4	3	2·6
6 „ „ 7	0	0·0	0	0·0
7 „ „ 8	0	0·0	0	0·0
8 „ „ 9	0	0·0	0	0·0
9 „ „ 10	1	·8	1	·8
Age not stated	1	·8	0	0·0
	*121		117	

*The total number of deaths during 1882 was 155. The age of death was not stated on the inspection sheets in 34 cases.

Table II.

Day of Disease on which Deaths from Measles occurred.

DEATHS OCCURRING	1882.	THE TWO YEARS 1890 AND 1891.	1892
From 1st to end of 6th day	14	28	33
„ 7th „ 12th „	41	25	40
„ 13th „ 18th „	28	14	19
„ 19th „ 24th „	11	4	5
„ 25th „ 30th „	6	3	5
At later periods	15	3	—
At periods not stated	6	10	15
TOTAL	121	87	117

Table III.

Percentage of Total Deaths occurring during each period.

DEATHS OCCURRING	1882.	1890 AND 1891.	1892.
1st to 6th day	11·6	32·2	28·2
7th „ 12th „	33·9	28·8	34·2
13th „ 18th „	23·2	16·1	16·2
19th „ 24th „	9·1	4·6	4·3
24th „ 30th „	4·9	3·4	4·3
At later periods	12·4	3·4	—
At periods not stated	4·9	11·5	12·8
	100·0	100·0	100·0