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POLIOMYELITIS IN IOWA IN 1930

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In keeping with the experience of other states Iowa suffered in 1930 a considerable increase in the number of cases of poliomyelitis over what may be considered the “normal” or “expected” number. Table I will show the number of cases reported by months for the last seven years.

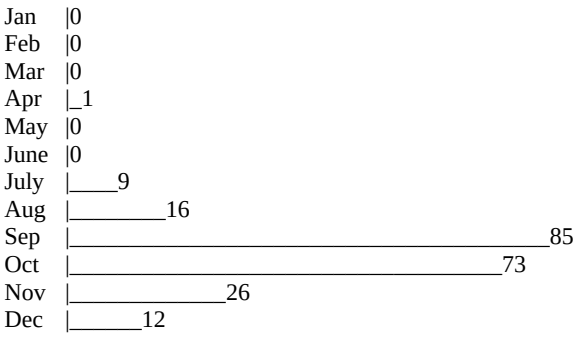
TABLE I

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1924	1	0	1	2	1	0	0	3	39	8	6	4	65
1925	0	0	0	2	1	0	8	24	61	59	16	5	176
1926	0	3	0	0	1	3	0	2	8	1	1	0	19
1927	2	1	0	0	1	0	1	9	28	36	17	14	109
1928	6	0	0	0	0	0	2	8	11	4	5	1	37
1929	2	2	1	5	1	4	1	4	17	26	8	5	76
1930	0	0	0	1	0	0	9	16	85	73	26	12	222
Total	11	6	2	10	5	7	21	66	249	207	79	41	704
Average	2	1	0	1	1	1	3	9	35	30	11	6	101

The seasonal variation of the incidence of poliomyelitis is shown definitely in this table and in Chart I, the months of September, October, and November being those in which there is the greatest incidence.

Chart I shows the proportionate number of cases occurring each month in 1930.

CHART I



[Map showing cases by month at end of article]

Two hundred nine cases were reported from 57 counties in Iowa from July 1 to December 1. (See map). Twelve cases were reported in December, making a total of 222 cases for the year. This is 46 more than have been reported at anytime since 1924. Case records were sent to physicians who reported cases with the request that the data be entered and the records returned. One hundred seventy-eight such records were returned, furnishing information on about 85 per cent of the cases.

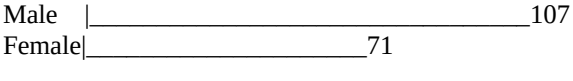
Analysis of the data given on these records affords some interesting information. Table II gives the age and sex incidence.

From this table it will be seen that 60 percent of those attacked were male and 40 per center females. This approximates the finding of Caverly in Vermont in 1917. The number of cases in his series (171) allows favorable comparisons with the 178 of the present series. His figures were, male 54.3 per cent, female 45.7 per cent.

TABLE II
Age and Sex Distribution of
178 cases of Poliomyelitis

Age	Male	Female
-1	2	2
1	4	3
2	6	8
3	5	4
4	5	6
5	6	3
6	10	2
7	4	5
8	13	4
9	4	6
10-14	26	9
15-19	12	11
20-24	4	5
25-29	3	0
30-39	0	2
40-49	0	0
50-59	0	0
60 plus	0	0
Age not given	3	1
Total	107	71

CHART II
Incidence of the disease by sex---1930



The figures for the age incidence in the present outbreak, however, differ markedly. Caverly* found that 54.9 per cent of his cases were in children four years of age or under, while in this outbreak only 25 per cent were in that age group. Caverly’s percentage in the age group five to nine was 27.5, while the present series give a

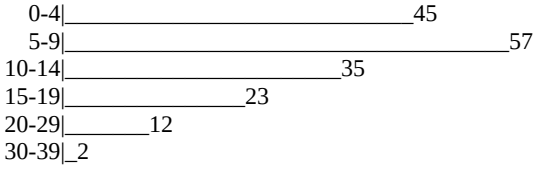
*”Infantile Paralysis in Vermont,” State of Vermont, Department of Public Health, 1924.

percentage of 30. In the age group ten to nineteen the Vermont percentage was 13, while in Iowa it was 32.6. The age group twenty to twenty-nine in Vermont showed a percentage of 2.9 and in Iowa of nearly 12. In the present series 57 per cent of the cases occurred in persons under ten years of age. In the Vermont series 82 per cent were under ten.

The figures suffice to show that the term "infantile" paralysis is a misnomer, for the reason that poliomyelitis attacks adolescents in far greater proportion than it does infants.

CHART III

Incidence of the disease by age groups---1930



DISTRIBUTION BY PARALYSIS

The following list gives the location of paralysis. In 154 of the 178 cases here recorded there was definite muscular impairment.

All extremities (arms and legs)	5
Both arms	1
Left arm	3
Right arm	7
Both legs	30
Left leg	22
Right leg	27
One leg	3
Both legs and abdomen	7
Left arm and both legs	2
Left arm and left leg	2
Right arm and both legs	5
Right arm and right leg	3
Facial (right)	1
Facial and throat	3
Throat	12
Respiratory (alone)	2
Both arms and respiratory	1
Left leg (incl. abdominal or respiratory)	1
Right shoulder	5
Shoulder	1
Back	2
Left arm, left leg, and esophagus	1
Right foot	1
Left foot	1
Both legs, left deltoid, throat	1
Left shoulder, left hip	1
Orbicularis oculi	1
Right eye, left arm, both legs	1
Bulbar	1
No paralysis	24
Not stated	1
	178

Delay in Calling Doctor. Some attempt was made to ascertain the period of delay between the onset of the disease and medical attention. It was found that the interval varied from the date of onset to two weeks afterward.

On 13 of the case records the dates of onset and those of the doctor's first visit were not given. Of the remaining 165, 20, or 12.1 per cent, called the doctor on the day the patient was taken sick; 38, or 23 per cent, called the doctor on the second day of the disease; 27, or 16 per cent, on the third day; 20, or 12.1 per cent, on the fourth day; 17, or 10.3 per cent on the fifth day. Only 35 per cent of the patients employed a doctor before the third day of the disease.

Other Illnesses. Correlation of cases with other illness in the family was sought but this was unsuccessful. In answer to the question, "colds or other illness in the family?" 37, or 21 per cent, answered "yes" and 136, or 63 per cent, answered "no", while 5 questions remained unanswered.

Roads. Correlation was also sought between the kind of road (paved, gravel, dirt) on which the patient lived and the incidence of the disease. This gave no results, for 61, or 35 per cent, lived on paved roads; 44, or 25 per cent, on gravel, and 66, or 36 per cent, on dirt, while 7 questions remained unanswered.

Convalescent Serum. Convalescent serum for the treatment of cases was used in 87 cases, or 48 per cent; other serum, (Lilly's, Rosenow's), was used in 13 cases, or 7 per cent, while 78, or 45 per cent, had no serum.

Convalescent serum is reputed to be most effective if used before paralysis occurs. Data were not procured to show the date after onset on which paralysis in the present series occurred, but information as to the time after onset that serum was given was received, with five exceptions.

In 8 cases, or 4.6 per cent, serum was given on the day of onset; in 13 cases, or 7 per cent, on the next day; 11, or 6 per cent, on the second day after onset; 22, or 12 per cent, on the third; 11 on the fourth; 6 on the fifth; 3 on the sixth, while 12 cases, or 13.7 per cent, received serum 7 days or more after the onset. One case was given serum 15 days after onset, and 34.6 per cent of the cases received serum before the fourth day of the disease.

Size of First Dose. The size of the first dose of serum varied from one cubic centimeter to 50 c.c. In four cases the dosage was not given. Of the 88 cases in which the dosage of convalescent serum was state, one received as the first dose 1 c.c.; six received 5 c.c.; twenty, 10 c.c.; one, 12 c.c.; four, 15 c.c.; forty, 20 c.c.; two, 25 c.c.; five 30 c.c.; eight, 40 c.c.; and one, 50 c.c. Some peculiar answers to the question of dosage were noted, e.g., one stated "750 units," one said "10,000 units" and one answered "10 drops night and morning for 10 days.

The number of doses given to one patient varied from one to six. The question was not answered in 4 instances. Thirty-four, or 35.4 per cent, received one dose, while an equal number received 2 doses. Fourteen or 14.5 per cent,

received 3 doses; eight received 4; five received 5; and one received 6. Since paralysis usually occurs by the third or fourth day after onset it is a matter for conjecture as to what results were expected from giving serum on the fifth and sixth days.

Results of Administration of Convalescent Serum. "Complete recovery" was reported in all eight of the cases which received serum on the day of onset; in 7 of the 13 cases receiving serum on the next day; in 3 of the 11 on the second day after onset; 4 of the 22 on the third day; one of the 11 on the fourth day; 2 of the 6 on the fifth day, and none of the three on the sixth day after onset. "Excellent" was reported in 5 cases in which the serum was administered on the third day after onset; in two cases on the fifth day, and in one on the seventh day.

"Good" results were reported in one case when serum was given on the second day of the disease; in 5 cases on the third; in 11 cases on the fourth; in 3 cases on the fifth; in two cases on the sixth and in one case each when serum was given on the seventh, ninth, tenth, thirteenth and fifteenth days.

"Slight improvement" was reported in one case where serum was given on the fourth day of the disease.

"No results" were reported in 4 cases which received serum on the second day of the disease; in one case on the third day; in 3 cases on the fourth day; in 6 cases on the fifth; in one case on the sixth; 2 on the seventh; one on the eighth; 3 on the ninth; 2 on the tenth. On six records the question was not answered.

Multiple Cases in Family We are taught that secondary cases of poliomyelitis in the same family are of rare occurrence. By "secondary" cases are meant those other cases in the same family in which the epidemiologic evidence would seem to indicate that the second case was infected from the first one. Data are lacking as to the number of children in the families of those ill with the disease, hence it is impossible to calculate the amount of exposure offered. In 11 instances, or 6.1 per cent, of the cases, multiple cases occurred in families. In only one of these, however, did three cases occur, the other families having two cases each.

In three of these families the dates of onset of the second cases were sufficiently late to warrant the suspicion that the second cases received their infection from the first case, in spite of the fact that the incubation period of the disease is not definitely known. In one of these the date of onset of the second case was 10 days after that of the first, in one, 11 days, and in the third, 12 days. In the first two, the patients were brother and sister, 6 and 11 and 4 and 2 years of age, respectively. In the third, they were girl and boy cousins, living together, 4 and 15 years of age, respectively. In the family with three cases, all the patients, 5, 3 and one year of age, were taken ill on the same day. In two families, brothers in each of two families 11 months 2 years and 14 and 23 years, and sisters of 4 and 7 years, were taken ill within one day of each other. In one family of sisters 9 and 15 the interval was 2 days. In two families, one of 2 sisters, 2 and 4 years old, and one of mother and son, 26 and 15 years old, the interval was four days.

In the instances of the cases occurring within four days or less of each other, such evidence would seem to indicate that both patients received their infection from a common source and the onset was later in the second case because of a longer incubation period or possibly because of higher resistance in the second patient. Here the question is raised, could not the incubation period of the second cases in the other families be as long as 10 or 11 or 12 days, and the source of infection be common to these as well as the others?

Deaths. Death was recorded in 16 cases, giving a case fatality rate of 9. Three deaths occurred on the second day of illness; 2 each on the third and fourth; 3 on the sixth; one each on the seventh and ninth; 2 on the tenth; one on the twelfth, and in one case the date of death was not recorded. Of those who died 12 or 75 per cent were males and 4 were females. By age groups, they were divided as follows:

	Male	Female
0- 4	1	1
5- 9	4	0
10-14	5	0
15-19	1	2
20-24	1	1
	12	4

Muscles Involved. The muscles involved in those who died were given as follows:

Respiratory	2
Right arm, right chest, throat	1
Both legs, left arm, respiratory, speech, bladder	1
Right arm and right leg	1
Lower face muscles and deglutition	1
Left arm and left leg	1
Right arm and forearm and deglutition	2
Bulbar paralysis	1
Respiratory and deglutition	2
All muscles of extremities	2
Left arm, left leg, palate, esophagus	1
Throat	1
Total	16

Day Doctor Called. Of the 16 deaths, the doctor was called on the day of onset in 2 cases; on the second day in

7 cases, on the third day in 3 cases; on the fourth day in one case; on the sixth day in one case and in two cases the date was not indicated.

Spinal Fluid. The spinal fluid was not examined in 7 cases, some of them marked "not permitted". Of the 9 remaining, the notations were as follows:

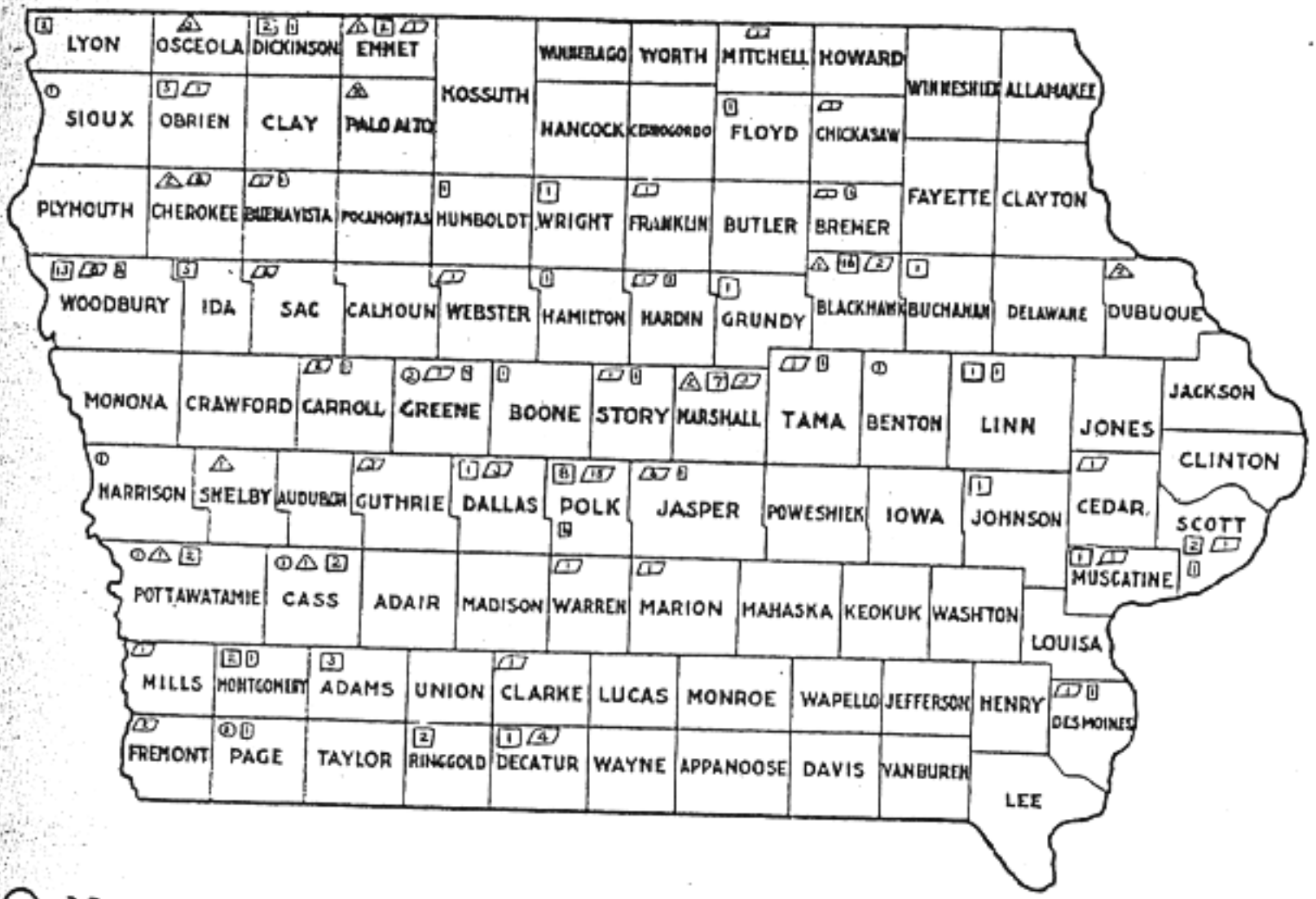
1. Normal
2. Negative, increased cells
3. 55 cells, tr. globulin
4. 430 cells, globulin
5. At autopsy, very bloody
6. 212 cells
7. 164 cells
8. 160 cells
9. 198 cells

There were colds or other illness in the family in one instance, no colds in 13 instances and the question was not answered in 2 instances.

Four of the deceased lived on paved roads, five on gravel, and six on dirt.

Eleven of the deceased were given serum as follows:

No.	Amt.	Day of 1st dose	No. doses
1	20 cc.	3	3
2	1 cc	2	2
3	12 cc. (Lilly's)	3	1
4	10 cc.	3	2
5	5 cc.	8	4
6	10 cc.	6	2
7	5 cc.	8	2
8	20 cc.	Not given	1
9	20 cc.	3	5
10	40 cc.	2	1
11	No data—Rosenow's serum		



○ Number in July

△ Number in August

□ Number in September

▱ Number in October

▯ Number in November