

5745

Abortive Poliomyelitis.*

S. D. KRAMER AND W. L. AYCOCK. (Introduced by Benjamin Kramer.)

From the Department of Preventive Medicine and Hygiene, Harvard Medical School, and the Research Laboratory, Vermont Department of Public Health.

We have shown a high rate of immunity to poliomyelitis in the general population,¹ and the distribution of this immunity is correlated with the incidence of the disease not only in the different ages but with concentration of population. The vast majority of urban adults were found to be immune and the incidence of immunity decreased rapidly and was lowest in the youngest age groups where the incidence of the disease is highest. We found the same type of curve to obtain in rural communities although there was considerably less immunity present. On comparing our findings with similar findings in diphtheria we found a very close parallelism between the two diseases.

It has become important to determine the mechanism by which this general immunization takes place. Since Wickmann's first suggestion of the probable occurrence of abortive forms of the disease the impression has become general that much, if not all, of this immunity is accomplished through abortive attacks of the disease.

During rather intensive studies in Massachusetts and Vermont over a period of years, we have not been convinced that there are any large numbers of such mild illnesses concurrent with an outbreak of the frank disease. A favorable opportunity to determine the incidence of such abortive forms at the time of an outbreak came to us in October, 1930, when 5 frank cases of poliomyelitis occurred in the town of Bedford, Mass., (population 1700) some 20 miles from Boston. With the appearance of the first case, residence was established in the town, and a house to house canvass made over a period of 6 weeks, and histories of all illnesses within 2 weeks previous to the appearance of the first case were collected. School was in session at the time and all of those stricken with the disease were pupils of the local school. Our previous findings had suggested a widespread dissemination of the virus and it was

* This work was supported by the Harvard Infantile Paralysis Commission, the Vermont Department of Public Health and the International Committee for the Study of Infantile Paralysis.

¹ Aycock, W. Lloyd, and Kramer, S. D., *J. Prev. Med.*, 1930, 4; *J. Exp. Med.*, 1930, 52, 457.

hazarded that many of the pupils in the school would be exposed to the virus present in that community at the time. Approximately 50 mild illnesses consisting essentially of unexplained headache, fever and vomiting, lasting about 24 to 48 hours, were found, 33 of these occurring in children under 15 years of age. Every case of such illness occurring at the time of our residence was seen and examined.

To determine whether or not these illnesses were actually abortive forms of poliomyelitis, neutralization tests were done on about half of the children and these were selected to include samples from every age group in that school. In order to properly evaluate the results of these neutralization tests a group of 28 children of the same ages who had not passed through any recognizable illness during that interval of time were taken. A third group of children of the same ages from an adjacent town where no poliomyelitis had occurred were similarly tested. These last 2 groups of children, added to our earlier rural and urban figures, gave a good base line for normal children of these age groups with which to compare the results of the tests upon the sera of those having suspected abortive forms of the disease. The results of the immunity tests in these 3 groups of children proved to be identical. The expectation of a high rate of immunity in those having passed through the mild illness did not materialize. These findings are summarized in the accompanying table. Since these bloods were taken about 5

TABLE I.
Neutralization Test for Immunity to Poliomyelitis.
Children, Ages 5-15.

	Total	Neutralized		Failed to Neutralize	
		No.	%	No.	%
Normal children previously tested	31	13	41.9	18	58.1
Burlington	29	13	44.8	16	55.2
Bedford—No illness	28	13	46.4	15	53.6
Bedford—Suspected abortive	20	8	40.0	12	60.0

months after the occurrence of illness any immunity which might have developed as a result of such an infection should have been detected at the time of testing. From these tests it therefore appears that the widespread immunization of a population does not take place entirely at the time of an outbreak but rather in a more or less uniform manner throughout the year, or in inter-epidemic periods. This rate may, of course, vary with variations in the presence of the virus in a community.