

volume marks a milestone in demonstrating the importance of planning for improving community-supported social services and in the utilization of research as a necessary tool in such planning. It suggests that the time is ripe for "significant experimentation with the systematic community-wide detection and reporting of disorders, diagnostic and prognostic classification, periodic review of progress or retrogression, analysis of the appropriateness of care and treatment, and basic evaluation of results" as timely means of making further progress in the management of community-supported social services and in the prevention and reduction of the necessity for such services.

BAILEY B. BURRITT

• • •

THE PREVENTION OF WHOOPING-COUGH BY VACCINATION¹

WHOOPING cough is an acute communicable disease that has its greatest incidence and severity among children less than 7 years of age. It is especially severe in infants of less than 2 years. The rapid decline in the incidence and severity of pertussis among older children without a history of a recognized attack makes the postponement of pertussis a most desired procedure. During the past thirty years mortality from pertussis has been reduced mainly by vaccination. Further reduction of pertussis by improved immunizing processes presents a challenging problem to the medical profession.

Since 1942 the Whooping-Cough Immunization Committee of the Medical Research Council has been carrying on investigations "to assess the prophylactic value of pertussis vaccines." In controlled studies carried on between 1942 and 1944 no significant differences were found between groups inoculated with pertussis vaccines and uninoculated control groups. Other similar studies, especially those carried on in the United States and Canada, reported that the pertussis vaccines used produced

¹ The Prevention of Whooping-Cough by Vaccination. A Medical Research Council Investigation. *British Medical Journal*, June 30, 1951, Vol. 1, p. 1464.

a significant degree of protection. Because of the disparity in results, the Whooping-Cough Immunization Committee concluded that "the vaccines used in their trials in 1942 and 1944 differed in some material though unknown way from those vaccines which have been shown to give protection."

A new study was undertaken by the Committee using pertussis vaccines prepared by two American manufacturers, the Messrs. Park, Davis and Company and the Michigan Department of Health, and one British manufacturer, the Messrs. Glaxo Laboratories, Ltd. The first trial, begun during World War II, provided valuable administrative data but, due to a personnel shortage, the follow-up studies were considered incomplete. This pilot study served as a basis for studies which began in November, 1946 and April, 1948 and ended in 1950. These subsequent studies are reported upon in this paper.

Ten field-trial areas were established and a uniform plan was followed in each. A "pertussis team" was appointed which was staffed mainly from the local health departments. Parents with children 6-18 months of age were given a pamphlet explaining the plan and objectives of the study. Interested parents signed a consent form and the resulting group of children were divided by the method of random sampling into two groups of approximately equal size: 1) a group to be vaccinated with the different pertussis vaccines; and 2) a group to be given a similar dose of "anticatarrhal vaccine" which contained no *H. pertussis*. Three inoculations were given at monthly intervals. Mothers were instructed to notify the local health department if their child had a known exposure to pertussis or if any suspicious symptom developed. After the inoculations each child was visited at frequent intervals for a period from two to three years by a nurse investigator. Neither the parents nor the observers knew whether the child was in the vaccinated or unvaccinated group.

The number of children who completed the three inoculations and remained to the end of the investigation was 6,710; 3,358 in the vaccinated group and 3,352 in the control group. The two groups of children were similar when certain relevant attributes were examined.

In all ten trials the attack rates per 1,000 child-months of

observation were 1.45 in the vaccinated group and 6.73 in the unvaccinated group—a ratio of 1 to 4.6. According to the authors of the report, “This difference in attack rates is clearly significant.” The ratio of attack rates was not the same for the ten trials, however.

The attack rates for the unvaccinated children were almost constant, varying only from 6.48 to 7.04 per 1,000 child-months of observation. Among the vaccinated children the vaccines were found to have prophylactic value of varying potencies. The Park, Davis vaccines gave substantial protection with a ratio to the unvaccinated group of 1 to 2.5. A slightly greater degree of protection was given by the Glaxo vaccines. The vaccines prepared by the Michigan Department of Health “gave a considerably greater degree of protection than any of the others; the ratios with these were 1 to 7.3 and 1 to 10.8.”

The attack rates are shown for children who had a known exposure to pertussis. The unvaccinated children had comparable attack rates for known exposures in all trial areas. The attack rates among the vaccinated children varied considerably with the different trials. This variation was related to the differing potency of the vaccines used. Differences in the severity and duration of pertussis attacks between the vaccinated and unvaccinated groups were noted also. In each trial area the vaccinated groups tended to have attacks with less severity (fewer paroxysms per 24 hours), and shorter durations than the unvaccinated groups.

An analysis was made which indicated that the immunity to pertussis among the vaccinated group remained fairly constant throughout the trial period. The attack rate in the unvaccinated children was almost constant during the whole period of observation and “it is therefore justifiable to compare the corresponding attack rate in the vaccinated children.”

The different vaccines used have been shown to have varying prophylactic value. These differences may be due to other variables such as the method of preparation by the different manufacturers, the differences in trial areas, and the different times of the trials. Further studies are being carried on both in Great Britain and the United States in the field and in the laboratory to test the potency of different vaccines.

In the United States, pertussis deaths per 1,000 live births among infants have dropped from 2.2 in 1916 to 0.9 in 1940. The Whooping-Cough Immunization Committee has made an important contribution toward further reductions in pertussis mortality by its research in the potency of the different vaccines. When immunizing against pertussis, it is certainly desirable to use the vaccine having the greatest prophylactic value.

JANE E. COULTER