REPORT OF THE COMMITTEE ON IMMUNIZATION PROCEDURES OF THE AMERICAN ACADEMY OF PEDIATRICS

JOHN A. TOOMEY, M.D., Chairman, Cleveland
HORTON CASPARIS, M.D., Nashville
E. J. HUENEKENS, M.D., Minneapolis
CHARLES F. McKHANN, M.D., Boston
BELA SCHICK, M.D., New York
EDWARD B. SHAW, M.D., San Francisco

January, 1938

REPORT OF THE COMMITTEE ON IMMUNIZATION PROCEDURES

I. THE COMMON COLD

A. **Test:** None. B. **Active Immunity:** No active immune principle of any proven value has been described. C. **Passive Immunity:** None.

II. DIPHTHERIA

A. **Test:** The Schick test: Inject intradermally 0.1 cc. of diphtheria toxin diluted in saline. Some manufacturers put the same test dose of toxin in 0.2 cc. of saline. The use of readily diluted toxin for the Schick test is fairly common and sufficiently accurate for general clinical use. Read the test in from 48 to 72 hours. An area of redness of 0.5 cm. in diameter or more denotes a positive test and susceptibility. Pseudo reactions should be noted. These are an indication of an acquired sensitivity to the proteins of the diphtheria bacilli and occur mostly among children who have been immunized.

B. **Active Immunity:** Three types of material are used for active immunization against diphtheria: (1) toxin antitoxin—for individuals over 10 years of age, injected subcutaneously in doses of 0.5 cc., 1 cc. and 1 cc. at weekly intervals; (2) diphtheria toxoid or (3) alum precipitated toxoid for children under 10 years of age—each toxoid material to be injected in doses of 0.5 cc., 1 cc. and 1 cc. at **weekly** or **longer** intervals. Variations of these doses have been used if reactions follow the initial injection. All of these materials will immunize, although it may take as long as a year for a Schick test to become negative after the use of toxin antitoxin as compared to a month following injections of toxoid. One dose of alum precipitated toxoid does not immunize an individual as was originally thought.

Always do a Schick test within 6 months after immunization to determine whether immunity is present. Do not immunize before 9 months of age.

C. **Passive Immunity**

1. **Treatment**: The bulk in which the dosage of diphtheria antitoxin is contained is now so small that it need not be considered. It is no longer necessary to remember the dosages by age, weight, etc. The important thing is to know how long the patient has been ill and to appreciate the severity of the disease. If it is mild or moderately severe, from 20,000 units to 40,000 units of antitoxin are given intramuscularly. If the patient is seriously ill, from 40,000 units to 80,000 units of antitoxin may be given intravenously or intramuscularly. If the pulse pressure has fallen, the antitoxin should be given intravenously. If the case is one of diphtheria gravis, from 80,000 units to 200,000 units may be necessary. Some members of the Committee feel that there is no difference in the results obtained with the use of 40,000 units or 200,000 units of antitoxin. It should be stated, however, that in order to neutralize diphtheria gravis toxin a much greater number of antitoxin units is needed than is necessary to neutralize Parke #8 strain toxin from which our antitoxin is made. Watch for immediate, accelerated and late serum reactions.

2. **Exposures** may be given from 1,000 units to 2,000 units of antitoxin intramuscularly. It is felt that exposures should not be given antitoxin except under exceptional circumstances or in country practice where the patient sometimes cannot be seen regularly.

III. EPIDEMIC ENCEPHALITIS

A. **Test**: None. B. **Active Immunity**: None. C. **Passive Immunity**—1. **Treatment**: From 50 cc. to 75 cc. of convalescent serum has been injected as a passive immune principle, but there is no evidence that it is of any value. 2. **Exposures**: There is nothing of proven value.

IV. ERYSIPELAS

A. **Test**: None. B. **Active Immunity**: A vaccine has been recommended for those who repeatedly contract the disease. It is not practical and there is no evidence that it has any value.

C. **Passive Immunity**—1. **Treatment**: Erysipelas antitoxin has been used as a passive immune principle, but there is no conclusive evidence that it aborts, lessens the attacks or stops the spread of the disease. There is no evidence that convalescent serum will be of any value in this disease. Sulfanilamide has been recommended.

The object here is to maintain a proper concentration of the drug in the blood stream—about 5-10 mgm. per cent. The dose for the first day is about 1 grain to the pound, half of which is given as soon as possible and the other half spaced over the next 24 hours. For the next 2 days the dose is ½ grain to the pound divided over 24 hours. Continue this sustaining dose if necessary. Watch for cyanosis, morbilliform eruptions, vomiting, temperature rise, etc. After 300-400 grains have been given be extra cautious and watch carefully for symptoms. This drug should not be used in the cases where severe liver disease is present and with caution where severe kidney damage exists. 2. **Exposures:** There is no specific therapy.

V. EPIDEMIC MENINGITIS

A. **Test:** None. B. **Active Immunity:** None. C. **Passive Immunity—Treatment:** Specific antiserums, specific antitoxins and sulfanilamide have been recommended. (1) Where antiserums are used, it is often preferred to give the patient massive doses for two days and then gradually to discontinue therapy. One contagious disease hospital injects the patients intrathecally twice a day, giving from 10 cc. to 30 cc. of serum each time. The patient is also injected intravenously or intramuscularly three times a day and given from 30 cc. to 90 cc. of serum each time. Thus, 10 treatments will be given in 48 hours and the total number of treatments tapered off gradually,—omitting one intrathecal injection the third day, an intravenous or intramuscular treatment the fourth day, and so on. When intrathecal injections are made, the amount of serum introduced is always about 5 cc. less than that amount withdrawn by spinal tap **after the pressure has become normal.** Never exert pressure when injecting serum intrathecally. (2) Where antitoxin is used, one contagious disease hospital gives a continuous slow intravenous drip of from 100,000 units to 150,000 units of antitoxin in 1,000 cc. saline to which 1 cc. of 1:1,000 adrenalin has been added. The spinal fluid findings and the condition of the patient determine whether further therapy is indicated. (3) Sulfanilamide has been used as outlined under ERYSIPELAS. The drug has also been given intraspinally, although some members of the Committee feel that ingestion of the drug is sufficient. (4) The practice in most contagious disease hospitals is to combine either antitoxin or antiserum with sulfanilamide. **Note:** Watch for relapses. Do not treat serum sickness for a relapse. The treatment as outlined above may be varied to suit the circumstances.

VI. EPIDEMIC PAROTITIS

A. **Test:** None. B. **Active Immunity:** None. C. **Passive Immunity**—1. **Treatment:** Convalescent serum has been used in doses of from 50 cc. to 100 cc. and is injected intramuscularly to prevent complications. There is no definite proof that it will prevent complications. 2. **Exposures:** From 6 cc. to 10 cc. of convalescent serum have been given intramuscularly, but there is no evidence that it has any value.

VII. PERTUSSIS

A. **Test:** None. B. **Active Immunity:** The materials used are as follows: (1) Krueger's endo-antigen: 1.0 cc., then 1.5 cc. subcutaneously every other day for six doses. It is not of proven value. (2) Sauer's vaccine: 8 cc. to 10 cc. of vaccine standardized to ten billion organisms per cc. One cc. is injected under the skin in the deltoid area of each arm, 1.5 cc. to 2 cc. in the biceps area of each arm and 1.5 cc. to 2 cc. in the triceps area of each arm at weekly intervals. Its value has neither been definitely disproved nor proved. (3) Old-fashioned vaccine: not of proven value. Immunization may be begun after the child is 3 months of age.

C. **Passive Immunity**—1. **Treatment:** (a) From 35 cc. to 50 cc. of convalescent serum have been used intramuscularly. This treatment is not of proven value.

Certain agents used in the production af active immunity have been used in treatment. (b) Kreuger's endo-antigen mixed: 0.5 cc. to 2 cc. daily for from 10 to 15 injections—of no proven value. (c) Topagen: ¼ cc. into each nostril each or every other day—given from 4 to 5 times for improvement and for 2 weeks to prevent return of the paroxysms—of no proven value. (d) Vaccines of various kinds: of no proven value. (e) Detoxified Pertussis Antigen: only experimental as yet. 2. **Exposures:** See ACTIVE IMMUNITY.

VIII. PNEUMONIA

A. **Test:** Bacteriological tests for type specificity; Neufeld's test for type pneumococcus specificity. B. **Active Immunity:** None. Felton's work with polysaccharide vaccine is still in the experimental stage.

C. **Passive Immunity**—1. **Treatment:** Antiserums as a passive immune principle have definite value in treating pneumonia caused

by types I, II, III, V, VII and VIII pneumococcic organisms. Other types of serums should be utilized as soon as available. Sulfanilamide should be used with type III infections. 2. **Exposures:** No therapy is advised.

IX. POLIOMYELITIS

A. **Test:** None. B. **Active Immunity:** None recommended. C. **Passive Immunity**—1. **Treatment:** From 25 cc. to 50 cc. of convalescent serum has been used for active and passive immunity. Its value has not been demonstrated in controlled experiments. 2. **Exposures:** No therapy is advised. Vaccination with vaccines is not recommended.

X. RABIES

A. **Test:** None. B. **Active Immunity:** Not generally practiced save in exposures. See EXPOSURES. C. **Passive Immunity**—1. **Treatment:** None. 2. **Exposures** are actively immunized by Semple's or Cumming's vaccine in the Pasteur Treatment. (a) Semple virus (killed): 14 doses—1 dose daily; after head or neck bites—2 doses daily for 7 days then 1 dose per day for 7 days. Injections are usually made into the abdominal and subscapular areas, and subcutaneously. (b) Cumming's virus: sterile brain tissue—virulence destroyed by dialysis against running distilled water—14 injections, once a day for slight lacerations. Each container holds about 2.0 cc. For severe bites, 21 injections—starting two injections a day for the first 5 days and then one injection a day thereafter. Patients bitten about the nose and face, and children under 10 years of age should be given 21 injections. Occasional paralyses may occur with the use of vaccine. This, however, is not so important as the fact that the mortality rate in this disease is from 60% to 90%.

XI. MEASLES

A. **Test:** None. B. **Active Immunity:** None.

C. **Passive Immunity**—1. **Treatment:** Adult whole blood, human convalescent measles serum and placental globulin extract have been used as passive immune principles. It has not been shown that adult whole blood is of proven value. Convalescent serum in amounts of 50 cc. or more is of value. From 2 cc. to 10 cc. of placental globulin extract have been used in the prodromal stage of the disease. 2. **Exposures:** In order to prevent measles, 10 cc. of

convalescent serum should be injected within the first few days after exposure. The objective, however, should be to modify and not to prevent the disease. The serum should be given on the sixth day after exposure, although it is pertinent to note that permanent immunity does not invariably follow modified measles. If convalescent measles serum is not available, from 2 cc. to 4 cc. of placental globulin extract may be used either to prevent or to modify the disease.

XII. SCARLET FEVER

A. **Test:** The specific test is the Dick test. Although it is not 100 per cent perfect, it generally indicates a susceptible individual. If the physician remembers the small percentage of negatives that may be susceptible, the test is invaluable. Inject 0.1 cc. of scarlet fever toxin intradermally and read in 24 hours. If there is an area of redness of 0.5 cm. or larger, the test is positive. B. **Active Immunity:** Scarlet fever streptococcus toxin is used to immunize susceptible individuals. A Dick positive reactor may be rendered negative by injecting increasing skin test doses of scarlet fever toxin—500, 800, 2,000, 8,000, 80,000 units at weekly intervals. Some of the Committee feel that scarlet fever immunization cannot be put in the same class with diphtheria immunization and should be presented as a less desirable procedure carried out under definite conditions of exposure. Immunization should not start before 12 and preferably after 18 months of age.

C. **Passive Immunity**—1. **Treatment:** Scarlet fever antitoxin has been used as the passive immune principle. Its use may be associated with severe serum sickness. Recently, purified scarlet fever antitoxins have been described which do not cause so many reactions. One or two ampoules—from 6,000 to 12,000 antitoxin units should be used as early as possible. Convalescent serum may be of value, but it should be used in large amounts, at least from 80 cc. to 100 cc. 2. **Exposures** should not be given anything.

XIII. STAPHYLOCOCCUS INFECTIONS

A. **Test:** None. B. **Active Immunity:** Staphylococcus toxoid may be used as an active immune principle. Its use is limited, and still in the experimental stage, and its effectiveness has not been determined.

C. **Passive Immunity**—1. **Treatment:** Staphylococcus antitoxin

has been used, but there is no evidence that it is of any value. 2. **Exposures:** No therapy is recommended.

XIV. TETANUS

A. **Test:** None. B. **Active Immunity:** Tetanus toxoid has been recommended in doses of 0.5 cc., 1.0 cc. and 1.0 cc. at weekly intervals. It is of proven value, but its use is limited.

C. **Passive Immunity**—1. **Treatment:** Tetanus antitoxin as a passive immune principle is of proven value. The amounts that should be used are sometimes massive, from 100,000 units to 800,000 units injected intramuscularly and intravenously. Some of the Committee feel that 40,000 units will accomplish the same result as a massive dose. 2. **Exposures:** Inject from 1,000 units to 2,000 units of tetanus antitoxin intramuscularly. This must be repeated in from 7 to 10 days if the wound is deep or on the face, or if it covers a large area and if the exposure has been massive.

XV. TUBERCULOSIS

A. **Test:** The tuberculin test is of proven value, although it does not denote activity save in children under 2 years. It is possible, although improbable, that a child might have recovered from the disease at that age. A persistent negative tuberculin test in a dilution as low as 1/10 is generally considered to mean that the individual does not have tuberculosis.

B. **Active Immunity:** B.C.G. vaccine has been recommended, but there is no conclusive evidence of its value, and it is as yet experimental. B.C.G. vaccine should not be used in private practice. C. **Passive Immunity**—1. **Treatment:** There is no passive immune principle. 2. **Exposures:** No therapy.

XVI. TYPHOID FEVER

A. **Test:** None. B. **Active Immunity:** Typhoid fever vaccine injected subcutaneonsly in doses of 0.5 cc., 1.0 cc. and 1.0 cc. is used as an active immune principle in those localities where typhoid fever is a common occurrence. The immunity does not last longer than 2 years. A common practice is to reinject 1 cc. every year in the spring of the year.

C. **Passive Immunity**—1. **Treatment:** Schwartzman's antityphoid serum may be mentioned; it is only of experimental value. 2. **Exposures:** Vaccinate with typhoid fever vaccine.

XVII. VARICELLA

A. **Test:** None. B. **Active Immunity:** Vesicle contents have been used to immunize, but there is no conclusive evidence that the procedure is of any value. C. **Passive Immunity**—1. **Treatment:** Convalescent serum has been used, but it is the consensus of opinion that it is useless. 2. **Exposures:** Ten cc. of convalescent serum has been used intramuscularly, but the results are not convincing.

XVIII. VARIOLA

A. **Test:** There is no specific test for the disease, although a reaction of immunity following vaccination is sufficient evidence of immunity if there has been a previous history of vaccination and objective evidence of an old vaccination scar.

B. **Active Immunity:** Calf vaccine smallpox virus is recommended as an active immune principle of proven value. (1) Vaccination is sometimes carried out by scarifying the skin with a knife and rubbing the vaccine material into the denuded area. This method is not recommended. (2) It may also be performed by criss-cross scratching of the epidermis with a needle or other sharp pointed instrument and rubbing the virus into the scratched area. This is not recommended. (3) A drop of vaccine is placed on the skin and multiple acupunctures are made into the skin and through the vaccine. This is the method recommended by the United States Public Health Service. (4) Vaccination may be done intradermally. The contents of a capillary tube is sucked into a small needle, normal saline drawn into a Tuberculin syringe up to the 0.2 mark, shaken and 0.1 cc. of this mixture injected intradermally. **Caution:** Never put an occlusive dressing, shield, etc., over a vaccinated area. Never draw blood when vaccinating. Just go through the epidermis. Vaccinate as early in life as possible—at least before 3 years of age, since post-vaccinial encephalitis does not occur before that age.

Virus has been artificially grown by Goodpasture and Rivers. There is no evidence at hand that these vaccines are any better than the present universally used calf vaccine. However, there may be practical reasons for their use in warmer climates and under certain circumstances.

C. **Passive Immunity**—1. **Treatment:** None. 2. **Exposures:** Vaccination.