

Current Practice

TODAY'S DRUGS

With the help of expert contributors we publish below notes on a selection of drugs in current use.

Immunization Schedules

Immunization schedules are intended to serve as guide lines for those responsible for ensuring that children are collectively and individually protected against certain communicable diseases. Suitable vaccines are available for immunization against diphtheria, tetanus, whooping-cough, poliomyelitis, measles, smallpox, and tuberculosis, but as they cannot be given together it is desirable to arrange a simple programme of immunization, taking into account what is safe, effective, practical, and most likely to result in the immunization of the maximum number of children. A number of factors have to be considered when constructing such a programme.

Combined and Simultaneous Vaccination

The number of injections to be endured by the child, the number of clinic visits to be paid by the mother, and the administrative costs to be met are reduced as a result of the incorporation of diphtheria, tetanus, and pertussis vaccines (D.T.P.) into one effective trivalent vaccine. In addition, simultaneous administration of oral poliomyelitis vaccine (O.P.V.) with D.T.P. further increases the efficiency of the immunization service without reducing the safety and efficacy of the vaccines.

Number of Vaccinations

A single administration of a live vaccine, such as measles, smallpox, or B.C.G., usually produces lasting immunity against the corresponding disease, but a single administration of trivalent O.P.V. may not result in simultaneous development of immunity against all three types of poliovirus. Second and third feedings are necessary in order to give each of the three types of poliovirus an opportunity of colonizing the intestines.

A single injection of pertussis vaccine containing killed organisms and of diphtheria and tetanus toxoids does not provide protection; three adequately spaced injections are required.

Intervals between Vaccinations

Adequate antibody responses to the three components of D.T.P. are not obtained unless a minimum of four weeks elapses between successive injections; even better results are obtained when the intervals are increased to six weeks or longer. Intervals of four to six weeks should also elapse between successive feedings of O.P.V., the reason being that one type of poliovirus may be prevented from establishing itself in the intestines while one or both of the other types are still multiplying, a process which may last four to six weeks after the initial infection was produced.

It is common practice in this country to allow six weeks between administration of measles, smallpox, and B.C.G. vaccines, although in some tropical countries measles and smallpox, or B.C.G. and smallpox, are given simultaneously.

Age of Immunization

The optimum age for administration of any vaccine is determined by a variety of factors.

The antibody response of infants to *diphtheria toxoid* and *oral polio vaccine* improves with age as the child's immunological mechanisms mature and transplacentally transmitted maternal antibodies are eliminated from the circulation. These factors argue in favour of delaying immunization until the child is 6 to 12 months of age; but *whooping-cough* is a particularly severe disease during infancy, and therefore a strong case can be made for early administration of D.T.P. Most authorities now recommend that the course of D.T.P. with O.P.V. should commence between the ages of 2 and 6 months.

Residual maternal antibodies render live *measles vaccine* ineffective in most children under 6 months of age and in some until they are almost 1 year old. As a child becomes responsive to live vaccine so also does he become susceptible to measles. Routine vaccination should therefore be carried out after the age of 10 months, but should not be delayed long after the age of 12 to 15 months, particularly when a measles epidemic is expected. In some practices a dose of inactivated measles vaccine is given four to six weeks before the live vaccine.

Primary *smallpox* vaccination will "take" at any age from birth, but the risk of post-vaccination encephalitis, although low in infants vaccinated during the first year of life, is even less among those vaccinated during the second year. Smallpox vaccination should therefore be postponed until the second year of life.

All tuberculin-negative children in close contact with a case of *tuberculosis* should be B.C.G. vaccinated irrespective of their age. Routine immunization of tuberculin-negative children is otherwise carried out at the age of 11 or 12 years, thus ensuring that they are tuberculin-positive during puberty and adolescence, when the risk of tuberculosis would otherwise increase.

Booster Doses

The antibody titres produced by a course of D.T.P. and O.P.V. in infancy wane with time but are readily boosted by further administration of the vaccines a year later. A further booster dose of diphtheria and tetanus toxoid and of oral polio vaccine is required at school entry in order to maintain a high state of immunity. By the age of 5 whooping-cough is rarely a serious disease, and the pertussis component renders triple vaccine particularly reactogenic in these older children.

Practical Considerations

Immunization schedules should be simple to remember, easy to administer, and, when followed, prove to be safe and effective. A schedule involving three vaccination visits during both the first and second years of life would read:

Age	Vaccines	No. of Vaccinations
3 to 6 months ..	Commence course of three administrations D.T.P. + O.P.V.	Three at intervals of not less than four weeks
1 to 2 years ..	Measles vaccination, smallpox vaccination, booster D.T.P. + O.P.V.	Three at intervals of not less than four weeks
First year at school	Booster D.T. + O.P.V.	One
8 to 12 years ..	Booster D.T. + O.P.V.	"
12 years ..	B.C.G. for the tuberculin negative	"