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IMMUNIZATION AS A PUBLIC HEALTH TOOL

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Despite being one of the most powerful and cost-effective means of preventing disease, immunization remains tragically under-utilized. As a consequence, diphtheria, pertussis, tetanus, tuberculosis, measles and poliomyelitis remain uncontrolled in the developing world, killing 10 children and disabling 10 more with each passing minute.

To address this problem, in 1974 the World Health Assembly created the Expanded Programme on Immunization (EPI). The programme's primary goal is to reduce the morbidity and mortality due to the above 6 target diseases by providing immunization against them for all children of the world by 1990. The EPI seeks to support national programmes so they can effectively deliver these and other vaccines of public health priority and so they can continuously sustain high levels of immunization coverage. Such national programmes are needed today, and their value will increase in the future as new vaccines are introduced.

The high incidence and great severity of these diseases in the developing world is due to a vicious cycle of infection and malnutrition, with either factor capable of initiating the cycle. Children often have their defense mechanisms compromised from the start by low birth weight, and then are assailed by a series of stresses which include whooping cough, measles and weaning on top of repeated episodes of diarrhoea and malaria. Each event sets the child back in growth and development and, if the interval between events is too short, the child cannot recover and dies.

Immunization services alone can be effective in preventing specific diseases which can precipitate malnutrition and, by permitting the child a longer recovery period between the events mentioned above, can help break this cycle and contribute to the overall reduction of childhood mortality.

But immunization services are best delivered along with other services of high relevance to children in their first years of life and to pregnant women: the persons who constitute the priority groups for primary health care services in the developing world. These services include oral rehydration of diarrhoeal diseases, malaria treatment and prophylaxis, and counselling with respect to childspacing, nutrition during pregnancy, breastfeeding, weaning, clean water and sanitation. Not only do such services act in synergy to break the cycle of infection and malnutrition, but the availability of each service helps promote the utilization of the other services by the population concerned, leading to greater efficacy and lowered cost per service delivered. WHO therefore believes it important to promote the EPI in such a way that it can contribute to the use of these other services and to the general strengthening of the primary health care infrastructure.

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Much has been accomplished since the beginning of the EPI, but much also remains to be done. National and regional information systems have been steadily improving and, although the information remains incomplete, it has been possible to provide some initial estimates of immunization coverage in the world (Table 1). If that is some of the good news, the bad news is that the coverage remains low. It is particularly low for poliomyelitis and measles vaccines in the South-East Asia Region, not due to any special problem relating to the vaccines, but due instead to the fact that these two diseases are only now coming to be recognized as major public health problems in this Region.

Information concerning the incidence of the target diseases is also improving, but at an even slower rate than the information concerning immunization coverage. We have decided to focus our global disease surveillance efforts on the three of the six target diseases which are expected to be the most easily diagnosed and the most influenced in the short term by immunization programmes: measles, neonatal tetanus and poliomyelitis. As of the end of 1982, few countries were reporting neonatal tetanus separately, so the data provided in Figure 1 refers to tetanus in general.

The graph indicates that the reported frequencies of these three diseases are quite different: there are almost 100 times the numbers of reported cases of measles than of polio. Reporting remains very incomplete, however, and a convenient estimate of the magnitude of the problem being posed by these three diseases in the developing world today is that 1/2% of all newborns will become lame from poliomyelitis, double that number or 1% will die within the first month of life from tetanus, and six times that number or 3% will die from measles.

The disease incidence trends reflected in Figure 1 should be interpreted with caution, as only a small fraction of cases are being reported from those areas where cases are most frequent. To complicate matters, that fraction is unlikely to remain constant, as diagnostic and reporting sensitivities should increase as immunization services are improved.

This phenomenon was seen during the smallpox eradication programme, where improvements in the surveillance system made it appear as though the disease was rapidly increasing, whereas, in fact, incidence was falling. To estimate actual disease trends during the next few years, results of disease incidence surveys and data from sentinel surveillance systems will be needed to complement that available through official reports.

After reviewing the EPI in May 1982, the World Health Assembly urged Member States of WHO to accelerate progress by taking action on a five point programme which calls for promoting the EPI in the context of primary health care, for investing adequate human and financial resources, for evaluating and adapting national programmes and for pursuing appropriate research.

The action programme identifies the lack of human resources in general and the lack of management skills in particular as being the EPI's most severe constraints. Capable senior and middle-level managers need to be designated in national programmes, and must be given the authority and the responsibility to carry out their tasks. They require training, not only to be effective with respect to the EPI, but also to contribute to the understanding and strengthening of the approach of primary health care. Reasons for low motivation and performance in the areas of field supervision and management need to be identified and remedial action taken so that managers visit, train, motivate and monitor the performance of those for whom they are responsible.

Financial resources will also be needed, as expanding the coverage of immunization services cannot be accomplished without expanding costs. While the international

community can be called on to increase their support for such items as vaccines, cold chain equipment and transport, it is the developing countries themselves who will have to contribute the most, as some 80% of programme costs involve staff salaries and daily operating expenses which outside agencies are generally reluctant to cover.

This highlights the first point in the action programme: promoting the EPI in the context of primary health care. From a national perspective, countries which have committed themselves to primary health care are those most likely to invest the human and financial resources required for the success of the EPI. At peripheral level, the success will depend on engaging communities as active partners in programme planning, implementation and evaluation. In some areas, an important aspect of community involvement is financial involvement. By supporting from local resources all or part of the costs of such items as gasoline, salaries and buildings, communities may be able to realize the benefits of immunization and other health services which would not be possible if national budgets alone were used.

The promotion of the EPI in the context of primary health care also entails promoting the integration of immunization services with other primary health care services, particularly those relevant for young children and mothers. As previously mentioned, when services are integrated, immunization coverage tends to be better and such services reinforce each other to help break the vicious cycle of malnutrition and infection which accounts for so much of the infant mortality in the developing world.

The fourth point of the Action Programme adopted by the World Health Assembly is concerned with evaluation. Immunization programmes are blessed with the good fortune of having easily obtained objective measures of success (and failure). If evaluation becomes an integral part of programme operations, strategies for the delivery of services and for the supervision and training of staff can be reinforced or revised as needed to attain high levels of coverage and low levels of incidence of the target diseases. If evaluation is not performed, or if it is performed but the results are ignored, the opportunity for programme improvement is lost. The World Health Assembly specifically recommended that by the end of 1985 at the latest, each country should be able to:

"- estimate reliably immunization coverage of children by the age of 12 months with vaccines included in the national programme;

- obtain timely and representative reports on the incidence of the EPI target diseases included within the national programme; and

- obtain information on the quality of vaccine so that it is known that the vaccines employed for the EPI meet WHO requirements and are potent at the time of use.

In addition, countries should promote the use of periodic programme reviews by multidisciplinary teams comprised of national and outside staff to ensure that operational problems are identified and that a wide range of experience is reflected in the recommendations which are made."

Last, but not least, the World Health Assembly called for research efforts to be pursued as a part of programme operations: "The objectives should be to improve the effectiveness of immunization services while reducing their costs and to ensure the adequate supply and quality of vaccines. Specific concerns include the development of approaches for delivering services which engage the full support of the community, the improvement of methods and materials relating to sterilization and the cold chain, the acquisition of additional knowledge concerning the epidemiology of the target diseases, further development of appropriate management information systems, and further improvement in the production and quality control of vaccines which are safe, effective and stable."

From this general overview of the Expanded Programme on Immunization, let me now turn to a specific issue which is relevant to your practice as pediatricians: that of the indications and contraindications for the EPI vaccines used in your national programmes.

The decision to withhold the benefits of immunization from an eligible child should not be taken lightly. Unfortunately, health workers in many countries are faced with long lists of contraindications which, when followed scrupulously, result in many children remaining unimmunized. The problem resulting from deferring immunization is greatest where access to health services is limited and the morbidity and mortality from vaccine-preventable diseases are high. Immunization is frequently postponed if children are ill, malnourished or about to be hospitalized. Yet they are the very children for whom immunization services are most needed. They are the ones most likely to die should they acquire a vaccine preventable disease.

It does not seem feasible or desirable to formulate a universal set of recommendations for immunization of children. We believe that each country should formulate its own policies reflecting local appraisal of risks and benefits, operational feasibility and socio-cultural acceptability of the specific recommendations. The national health authorities responsible for providing immunization services should play an active role in formulating the policies.

We also believe that, whatever specific policies are adopted, health workers should know that the benefits of routine childhood immunization are great, and the risks of serious adverse reactions are very low. Absolute contraindications to immunization with the EPI vaccines are very few and, in general, children should not be denied immunization without good reason.

Health workers should use every opportunity to immunize all eligible children, including ill or malnourished children. It is particularly important to immunize ill or malnourished children under the following circumstances:

- where there is a high incidence or an increased severity of the EPI target diseases, especially in children less than 18 months old;
- where access to health services is limited, where prompt follow-up is difficult and where immunizations are not likely to be completed if postponed;
- where immunization coverage is low;
- where children are most likely to visit the health services only when they are ill;
- where admission to hospital or attendance at health facilities, is, in itself, an important factor in the spread of infectious diseases of childhood, particularly measles;
- where refusal to immunize is likely to result in the child not being brought back for further immunizations.

Health workers will inevitably be faced with using their own best judgement when considering the immunization of an individual child. Often they have little time for screening, and need some simple and clear guidelines. We suggest the following for consideration:

- Every child visiting a health facility should be screened to determine immunization status, and eligible children should be immunized.

- Children with malnutrition, low grade or moderate fever, respiratory infection, diarrhoea or other minor illnesses should be immunized. Immunization of children so ill as to require hospitalization should be deferred for decision by the hospital authorities.
- Hospitalized children should be immunized before discharge and in some cases upon admission - for example, where there is a risk of hospital-acquired measles.
- A DPT series should be completed unless a child suffered a severe adverse reaction to a previous dose. If so, diphtheria and tetanus (Td or DT) vaccine without pertussis antigen should be given instead.
- Children with diarrhoea should be offered oral polio vaccine. However, this dose should not be counted as part of the full series and the child should be given another dose at the first available opportunity.

The Expanded Programme on Immunization needs everyone's help if it is to succeed, from parents to peripheral health workers to Ministry of Health officials to practising physicians to professors of pediatrics. We hope that pediatricians will take an active role not only in providing general endorsement and support to the goals of the EPI, but also in helping to formulate national immunization policies which assure that children receive the maximum benefit from the vaccines now at our disposition. Let us join together to protect the world's children with these triumphs of human research and development.

Thank you for your attention.

Table 1

Estimated percentage of children immunized in the first year of life and percentage of pregnant women immunized against tetanus, by WHO Region, based on latest information available as of 1 June 1983

Region	Percentage of population coverage by reports*	Percentage of children immunized by 12 months of age				Percentage of pregnant women immunized
		BCG	DPT III	Polio III	Measles**	Tetanus II
Africa	44%	31%	18%	17%	27%	18%
Americas	92%	39%	35%	36%	57%	7%
South-East Asia	98%	22%	25%	10%	1%	15%
Europe	26%	64%	70%	82%	63%	
Eastern Mediterranean	99%	22%	24%	28%	22%	4%
Western Pacific	19%	74%	61%	70%	15%	

* Where percentage differs for different vaccines, the highest percentage is shown.

** Some countries recommend measles immunization at, or later than, 12 months and up to 60 months.

FIG. 1
WORLD: REPORTED INCIDENCE RATES PER 100 000 POPULATION FOR
MEASLES, TETANUS AND POLIOMYELITIS, 1974-1981¹


