Second to clean drinking water, vaccination has become the most effective public health measure for the control of infectious diseases. The successful eradication of smallpox 3 decades ago naturally led to the optimistic view that childhood diseases could also be eradicated by vaccination. Indeed, there is good hope that some infectious diseases, e.g., polio and measles, may soon be eradicated. On the other hand, there are still some 3 million people, mostly infants and children <5 years of age living in developing countries, that die each year from diseases that are preventable by vaccines. This frustration must be balanced against the fact that new vaccines are continuously being developed and proven safe and are used with high efficacy in high-income countries. Disappointingly, we have also learned that experiences from high-income countries may not necessarily be directly applicable to low-income countries. The vaccines most needed are partly different, immune responses may vary and monetary resources and infrastructure are substantial obstacles for the implementation of the vaccine programs needed. For these reasons, this issue of *Annales Nestlé* is devoted to vaccines in a broader sense and using a global perspective.

In the first article, 'The impact of vaccines in low- and high-income countries', Professor Leif Gothefors at the Department of Clinical Sciences/Paediatrics, Umeå University, Umeå, Sweden, reviews the history of vaccines. He introduces the reader to important definitions used in vaccinology and reminds us of how modern vaccine programs were developed and what they have achieved. He highlights the role of the 'Expanded Programme on Immunization' created by the WHO in 1974. At that time, less than 5% of children were immunized against the 6 target diseases (tuberculosis, diphtheria, tetanus, pertussis, polio and measles). This figure has increased to some 75–85%, with the lowest figures applicable to low-income countries. He illustrates the conspicuous polarization between high- and low-income countries today; whereas low-income countries are struggling to get vaccines for their children who desperately need them, people in Europe and North America have become complacent about vaccines, advocating that they are no longer needed, as the diseases they are intended to prevent are no longer a threat and the vaccine is more dangerous than the disease itself. He gives learning examples of how those misconceptions have caused outbreaks of measles, diphtheria and pertussis.

In the following article, 'Determinants of responses to oral vaccines in developing countries', Professor David A. Sack from the Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Md., USA, together with colleagues Firdausi Qadri, Laboratory Science Division, International Centre for Diarrhoeal Disease Research, Dhaka, Bangladesh, and Ann-Mari Svennerholm, Department of Microbiology and Immunology, University of Gothenburg, Gothenburg, Sweden, discuss why oral vaccines, which are intended for global use, often induce less frequent and also lower antibody responses in children in developing countries, suggesting a less protective effect among children in those areas. Although the reasons are not well understood, several factors are indicated, e.g., undernutrition, micronutrient deficiencies including zinc and iron, interference from maternal transplacental antibodies and/or breast milk antibodies, intestinal viral infections, bacterial overgrowth with associated small intestinal mucosal pathology and possibly, maternal malnutrition. In contrast, there seem to be much less problems with injectable vaccines.
vaccines; only when children have severe malnutrition does the immune response to injectable vaccines become blunted. The authors conclude that particularly for oral vaccines one cannot assume that vaccines developed for children in developed countries will perform equally well when given to children in developing countries. They must be evaluated and optimized for these children to obtain the maximum benefit.

In the third article, Professor John Clemens at the International Vaccine Institute in Seoul, Korea, continues along the same line by sharing with the readers his experiences from the International Vaccine Institute on ‘Translational research to generate evidence for rational and efficient introduction of new vaccines in developing countries’. Contrasting to the developed world, the pace of introduction of new and improved vaccines into the public health programs of developing countries has been embarrassingly slow. As mentioned, the reasons, among others, are financial hurdles, programmatic obstacles and lack of evidence needed for rational policy decisions. This is of course most unfortunate since many new-generation vaccines, such as those against diarrhea, meningitis and pneumonia, are targeted against diseases that are major public health problems in developing countries. Translational research can be regarded as research aiming at translating both experimental vaccine candidates and already licensed vaccines into practical tools that are used in public health practice. In his chapter, Professor Clemens gives many fascinating examples of how this has been done at each step of the introduction of a new or an already existing vaccine into developing countries.

In the fourth and last article ‘Major issues in vaccine safety’, Doctors John K. Iskander, Jane Gidudu, Nelson Arboleda and Wan-Ting Huang at the Immunization Safety Office, Office of the Chief Science Officer, and the Epidemiologic Intelligence Service, Office of Workforce and Career Development, US Centers for Disease Control and Prevention, Atlanta, Ga., USA, develop the argument of the first chapter that in the USA and other developed countries, real or perceived vaccine safety issues may adversely impact vaccine programs, and therefore, robust post-licensure safety monitoring, which combines active and passive surveillance with use of standardized case definitions for adverse events, is the important scientific basis for assessing safety concerns. They exemplify current high-profile safety issues with 2 second-generation rotavirus vaccines, for which, based on previous experience, close monitoring of intussusception is necessary, at least in developed countries. Concrete examples are given on how primary care vaccine providers can contribute to enhanced safety of vaccines, as do strong recommendations that clinical health care providers should report safety concerns to local or national public health authorities through established channels, whether the vaccine involved is newly introduced or already established.

There is no doubt that vaccinology has developed fast during the last decades, and with it the potential to eradicate a number of severe infectious diseases. Also developed were surveillance systems on safety issues with standardized case definitions of adverse events and vaccine risk communication. Although we need a better understanding of mechanisms explaining why responses to particularly oral vaccines may differ between children in high-income and low-income countries, the remaining challenge is to overcome monetary and other obstacles which prevent introduction of effective vaccine programs into national health programs, covering all infants and children not only in all high-income but also in all low-income countries.

The Editorial Committee