

INTRODUCTION

The countries of the Americas have made tremendous strides in improving the health of the Region's peoples since the Pan American Health Organization was established just over 100 years ago. These improvements were due in great part to the implementation of national immunization programs. These programs, particularly those that operated over the last 25 years since the Expanded Program on Immunization was established in the Americas, have brought several vaccine preventable infectious diseases under control.

The Americas was the first of the world's regions to eradicate smallpox. Later, it also was the first to eradicate poliomyelitis, whose last indigenous case in the Americas occurred in Peru in 1991. This success led PAHO's Directing Council to set the goal of eradicating measles by the year 2000. As of this writing, more than one year has elapsed since the last indigenous case of measles was detected in Venezuela in September 2002. Recently, at its 44th Meeting, PAHO's Directing Council set a target for eradicating rubella from the Region by 2010.

Just as the disease eradication initiatives launched in the Americas have been expanded globally, innovative implementation strategies for immunization programs in the Region also have been emulated elsewhere.

Until a few years ago, immunization programs used just a few vaccines that had been developed several years ago. Among these were vaccines against diphtheria, tetanus, pertussis, tuberculosis, measles, and polio. Over the last decade, however, major advances in biotechnology made it possible to develop several new vaccines, and many candidate vaccines are now under way. Consequently, one of the challenges for health policy makers has been how to introduce these newly developed vaccines into national immunization programs. This is a particularly important issue, because new vaccines already available and those under development will certainly cost a great deal more than traditional vaccines already under use. A good example of this challenge has been the introduction of hepatitis B and *Haemophilus influenzae* type b vaccines, which were developed over 20 and 10 years ago, respectively, and only recently have started to be introduced in least developed countries. Latin American and Caribbean countries have pioneered the rapid introduction of these vaccines, thanks to the high-level political commitment of the governments and to financial mechanisms established by the PAHO Revolving Fund for Vaccine Procurement. The latter pooled the needs of all the countries,

thereby attaining economies of scale that allowed more favorable pricing. The Fund also allowed countries to pay off their debts in local currencies.

But the challenges ahead loom ever larger. Consider the vertiginous acceleration of vaccine development over time. For example, Jenner developed the smallpox vaccine in 1796, and it took about 100 years before Pasteur developed the rabies vaccine at the end of the 19th century. The first half of the 20th century, on the other hand, witnessed the development of several vaccines; the second half experienced an unprecedented leap in technology which allowed for the research and development of vaccines for more than 30 diseases, and real prospects for developing vaccines for diseases that were thought to be chronic and degenerative, but today are known to be the result of infectious diseases. Among these are vaccines targeting human papilloma virus, a major cause of cervical cancer, and *Helicobacter pylori*, which plays an important role in the pathogenesis of peptic ulcer and gastric cancer. The enormous progress in research and development in the field of vaccines makes us believe that the 21st century will be the "Century of Vaccines."

Given this accelerated progress, and to commemorate the Organization's first centennial, the Pan American Health Organization convened a conference so that experts at the vanguard in the field of vaccines and immunization could review the state of the art and look ahead to years to come. The conference, "Vaccines, Prevention, and Public Health: A Vision for the Future," was held at PAHO Headquarters in Washington, D.C., from 25 to 27 November 2002, and gathered more than 300 experts from the world over. The papers presented there marked the beginning of this book.

This book's chapters discuss progress made through vaccines used in most of the world's immunization programs, describe the status of introduction of the newest vaccines currently available to immunization programs, review progress in the development of vaccines against some bacterial and viral diseases that are responsible for much of mortality due to diarrheal and acute respiratory illnesses, as well as the quest for vaccines against HIV/AIDS, malaria, and dengue. A section addresses technological aspects of vaccine development, such as new concepts, including DNA vaccine technology, and new adjuvants and delivery systems. Diseases that may be used for bioterrorism, such as smallpox and anthrax, also are discussed.

Because of the growing importance that regulatory issues bear in the development and use of vaccines and the increased interest of consumers in being better informed on the use of vaccines, the book presents a discussion on the regulatory and safety issues surrounding the development, production and utilization of vaccines.

In the last section, the book looks into the future, particularly to the economics of vaccines and immunization and the impact that some aspects of health reform processes may have in the sustainability of programs and the perspectives for future disease eradication.

This publication is a product of the work of the best scientists in their fields, who not only participated in the conference, but also gave of their

time and dedication to work on the chapters included in this book. The Pan American Health Organization, as a whole, and I, in particular, are grateful to them. PAHO also is grateful to the conference's sponsors and to all of those who helped make this book a reality.

In 1970, the Pan American Health Organization convened the "International Conference on the Application of Vaccines against Viral, Rickettsial, and Bacterial Diseases of Man." That Conference was the beginning of the Expanded Program on Immunization, the Children's Vaccine Initiative and the recently formed Global Alliance for Vaccines and Immunization. We hope that this book, likewise, will set the stage for several new initiatives in the field of vaccines and immunization, bringing more diseases under control and offering the world's peoples a healthier environment, as immunization is and will continue to be the most cost-effective health intervention in our medical armamentarium.

Finally, this book is dedicated to the thousands of health workers throughout the Americas, particularly those that deal with vaccines and immunization, who dedicate their lives to improving the lives of their fellow citizens.

Ciro A. de Quadros
Editor