

IMMUNISATION AND CHILDREN'S HEALTH

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Summary

The cost-effective nature of vaccines mandates that they be available to all the world's children. The power of vaccines is illustrated by the global eradication of smallpox, the imminent eradication of poliomyelitis and great advances in the control of diseases like measles or diphtheria. While 80% of the world's children are now receiving childhood immunization, the substantial cost of newer vaccines, such as those against diarrhoeal disease, pneumonia and meningitis, represents a barrier to widespread use. A coalition involving the World Health Organization, UNICEF, The World Bank, the vaccine industry and private foundations, is picking up the challenge in collaboration with the developing countries.

1. Introduction

A vaccine is a preparation which can be injected or given by mouth to stimulate the body's natural defenses, namely the immune system, resulting in immunity to particular infections such that most recipients of the vaccine either do not get sick at all when they encounter the relevant pathogenic organism, or get mild symptoms only. The process of administering a vaccine is termed immunization. Vaccination is also used sometimes as a synonym for immunization. Vaccines are specific: poliomyelitis vaccine protects against polio, not measles. However, vaccines can sometimes be combined such as the diphtheria-pertussis-tetanus vaccine abbreviated to DPT or the measles-mumps-rubella (MMR) vaccine. The components of vaccines which stimulate the immune response are termed antigens. Vaccines can consist of living microorganisms that have been manipulated to eliminate their virulence or harmful effects (live, attenuated vaccines); killed microorganisms (killed or inactivated vaccines); or molecules of microorganisms (subunit vaccines).

Prevention is not only better than cure, it is also much cheaper. For this reason, vaccines are regarded as history's most cost-effective public health tools. If a vaccine is deployed sufficiently widely, it can actually eradicate a disease from the face of the globe, as the triumph of smallpox eradication has proven. Furthermore, immunization of 80-85% of a childhood population can lower disease incidence by 98% or 99%, as with the recently introduced meningitis (Hib) vaccine. This is due to an effect known as "herd immunity", where there is simply insufficient "soil" for the microbe to grow and spread if most people are immune.

It is therefore an enormous challenge to make the dozen or more vaccines of major public health importance available to all who need them, and to add new vaccines as these come through the research pipeline. For the foreseeable future, the cost burden for the poorest countries will be too great and foreign aid will be required.

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Biographical Sketch

SIR GUSTAV NOSSAL, AC, CBE, FAA, FRS was born in Bad Ischl, Austria, in 1931, and came to Australia with his family in 1939. He studied Medicine at The University of Sydney and, after residency at Royal Prince Alfred Hospital, took his PhD at The Walter and Eliza Hall Institute of Medical Research in Melbourne. Apart from two years as Assistant Professor of Genetics at Stanford University, one year at the Pasteur Institute in Paris, and one year as a Special Consultant to the World Health Organization, all Nossal's research career has been at the Hall Institute, of which he served as Director (1965-1996). Nossal was also Professor of Medical Biology at The University of Melbourne.

Nossal's research is in fundamental immunology, and he has written five books and 510 scientific articles in this and related fields. Nossal has been President (1986-1989) of the 25,000-member world body of immunology, the International Union of Immunological Societies; President of the Australian Academy

of Science (1994-1998); a member of the Prime Minister's Science, Engineering and Innovation Council (1989 to 1998); and Chairman of the Victorian Health Promotion Foundation (1987-1996). He currently chairs the committee overseeing WHO's Global Programme for Vaccines and Immunization (1993-).

Nossal was knighted in 1977 and made a Companion of the Order of Australia in 1989. He has received numerous other honours from 11 countries. Amongst the most significant are Fellow of The Royal Society of London, Foreign Associate of the US National Academy of Sciences, Member of the Academie des Sciences, France, the Robert Koch Gold Medal, the Albert Einstein World Award of Science, the Emil von Behring Prize, the Rabbi Shai Shacknai Prize, and over 100 named lectureships in ten countries.

Nossal is also involved in charitable work as Chairman of The Felton Bequests' Committee; in the business community as a Principal of Foursight Associates Pty Ltd; in aboriginal affairs as Deputy Chairman of the Council for Aboriginal Reconciliation; and in international advancement of Australia as Deputy Chairman of The Global Foundation.

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