A New Decade of Vaccines

The call for a new decade of vaccines was made in December 2010. The aims are to secure the further discovery, development and delivery of vaccination. The first challenge is the acquisition of funds for the research and development of 20 new vaccines. The Gates Foundation has pledged $10 billion for this venture. The other major players are WHO, UNICEF and the US National Institute of Allergy and Infectious Diseases. The top priorities are TB, AIDS and Malaria. It is hoped that a Malaria vaccine will available in 3 years. The ambitious target of saving the lives of over 7 million children has been set. The programme must also address the need for vaccines in insulin dependent diabetes, cancers and degenerative diseases.

Vaccines provide an almost perfect example of an intervention that we know will work to prevent unnecessary deaths and economic losses. Vaccines save lives, prevent suffering and create wealth. Vaccines have an outstanding record in preventing morbidity and mortality. There have been many wins. In 1967 there were 2.7 million deaths due to smallpox and this disease has been eradicated. The future eradication of polio is within sight. WHO has recently confirmed that Uganda is tetanus free with elimination of maternal and neonatal tetanus. The GAVI Alliance (Global Alliance for Vaccines and Immunisation) a public-private partnership, founded in 2000, is focused on saving childrens lives and gaining access to immunisation. GAVI is a very strong performer and has immunised 288 million children in the last decade. It has provided sufficient vaccine to save 5 million lives in developing countries. Vaccines against Pneumococcal Pneumonia, the cause of one third of infant pneumonia deaths, are also being rolled out in the third world. The burden of measles has largely been lifted. The Rotavirus vaccine offers the promise of saving millions of lives in infants with diarrhoeas. However, there are many challenges remaining. Among the 132 million children born across the world, 23 million children go unvaccinated.

Vaccination programmes are vulnerable to misinformation. They are administered to healthy individuals which makes safety an important priority. Many countries do not have a technical advisory group to co-ordinate and oversee immunisation policy. Countries need reliable international and national advice on which new vaccines to invest in and introduce to their population. The development of new vaccines is not necessarily greeted with the same enthusiasm and excitement as the introduction of other more technical medical innovations. The provision of authoritative clear facts about vaccination is not enough. The programme must be able to respond to adverse publicity and criticism. We need to learn how to generate trust in the wider community. More objective research is needed to determine how public confidence can be boosted and maintained. At the outset it is necessary to be balanced. While the benefits of vaccination should be emphasised the rare possibility of a side effect should be acknowledged, addressed and accurately quantified. It is encouraging that technologies for assessing vaccine safety are being developed in parallel with the new vaccines in order to detect safety issues from the outset.

Another problem is that individuals who refuse vaccination usually have different healthcare seeking behaviour and are apprehensive of many medical activities. The public has great difficulty in understanding risk, even a single adverse reaction can result in a disproportionate level of anxiety and fear. There is a need to provide a constant culture of support for vaccines. The paradox is that the present distrust is operating at a time when vaccination has never been so effective. One of the features of the new vaccines is their high level of safety compared with older preparations. Acellular pertussis vaccines have less reactogenicity than the older whole cell vaccines. Conjugate vaccines such as H Influenza type b vaccine were developed in the 1980s have been a great success. Conjugate vaccines contain a bacterial capsular polysaccharide joined to a protein to enhance immunogenicity. Richard Moxon, a paediatrician responsible for the development of the Haemophilus influenzae type b vaccine says that the field is suffering from somewhat of a crisis. He talks of the shadows of suspicion that have engulfed both government and industry. He criticises the media for being guilty of extreme irresponsibility that has obscured the truth about vaccines.

The spectrum of diseases and conditions being prevented by vaccination is widening. Vaccines will be developed not only for infants but also for other groups including healthy adults, pregnant women and the elderly. Vaccination may become part of the prevention of cancer, autoimmune disease and Alzheimers disease. Gardasil vaccine for the prevention of cervical cancer is now well established. Previously successful vaccines were developed by microbiologists who isolated antigens that induced immune responses to pathogen components. Future vaccine development will need to be different because of the extensive antigenic variability of new pathogens. The new methods will include reverse vaccinology, structural biology and systems biology. The increased scientific, funding and organisational activity in vaccination development is exciting. It opens up a new era of disease prevention and better health for all age groups on a global scale.

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References