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A boost for vaccines

As medical interventions go, immunization is unequaled in terms of medical and economic effectiveness. Yet, as part of a global health-care policy it is underused. A better appreciation of the importance of global planning of vaccine development and implementation, and closer cooperation between key players, would improve matters.

Recent history shows that when academic institutions, industry, politicians and community health organizations combine resources to produce and distribute a vaccine, the results can be stunning (see Table). These successes need not be restricted to developed countries—witness the 1977 worldwide eradication of smallpox, or the Indian experience with polio vaccine in which 100 million children were immunized over a two-day period in 1996.

Yet many major pathogens remain unchecked. World Health Organization (WHO) figures for 1995 list acute respiratory infections as the single biggest cause of death world wide, followed by diarrhea, tuberculosis and malaria. Why are there no vaccines against these diseases, each responsible for between 2 and 4.5 million deaths annually? Comparing this list to that of current US clinical trials of vaccines provides one explanation. Figures for 1997 on vaccine trials in the United States show that approximately 35% are for cancer, followed by HIV (15%) and other sexually transmitted diseases (STDs) (8%). Thus, whereas cancer, HIV and STDs appear to be attracting the lion's share of vaccine development, it is respiratory infections, diarrhea, tuberculosis and malaria that are killing most patients. If this differential reflects the national interests of those industrialized countries developing vaccines, it is a short-sighted policy.

Last month, during a visit to India, Donna Shalala, US Secretary of Health and Human Services, reminded her audience that in 1918, 'Spanish flu' spread around the world like wildfire, killing an estimated 40 million people in just eleven months. It was an infection that recognized no borders, whether geographic, economic or cultural. Rotavirus is another—a 1997 WHO report estimated that rotavirus, the most important cause of diarrhea worldwide and responsible for around 30% of all fatal cases, kills approximately 2,000 people every day. Most of these deaths are of children in developing countries, not because rotavirus affects children only in these countries, but rather because of the poor availability of health-care once infection strikes. The same virus costs the United States about $1 billion each year in hospital and indirect expenses. Here then is an example of a disease crying out for a vaccine and a vaccine that could have a phenomenal global impact if it could be made available to all who need it. Indeed, Wyeth-Lederle and Merck & Co., two of the biggest industrial companies in the vaccine field, are testing rotavirus vaccines, concentrating mainly on US and other industrialized countries. Following a vote of confidence in December 1997 from the Food and Drug Administration, Wyeth-Lederle's vaccine is expected to reach the American public in late 1998. It is nevertheless disturbing to note that it typically takes 15 years for a new vaccine developed for the private industrial sector to find its way into developing countries (P. Evans, WHO Global Programme for Vaccines and Immunizations, quoted in CVI Forum, June 1997 issue). Fifteen years is simply too long to wait, particularly given that it is in developing countries that the real effect will be felt.

It has been pointed out many times before, yet bears repeating again; when it comes to infectious diseases, no country or industrial community can afford to consider itself an island with a unique and protected set of health priorities. Rotavirus infections, AIDS, tuberculosis, influenza and many other diseases illustrate this truism. In the light of this inescapable fact, an even greater effort is required to assemble the requisite expertise from industry, academic institutions and health authorities to ensure that vaccine research concentrates on the most pressing needs, and that development is brisk and implementation broad. Groups such as the Children's Vaccine Initiative (a global coalition of private, public and non-governmental groups sponsored by UNICEF, UNDP, World Bank, WHO and the Rockefeller Foundation) have done much to encourage such collaborations. They and all within the vaccine community must redouble their efforts to convince governments and other funding organizations that infectious diseases are not a national issue, that more research money is required to fund early-stage research and to persuade industry that their investments will pay off.

Impact of vaccines on U.S. disease

Disease	Maximum recorded cases (year)	1992 cases	1996 cases
Measles	894,000 (1941)	2,200	500
Pertussis (Whooping cough)	265,000 (1934)	4,000	6,400
Diptheria	207,000 (1921)	4	1
Mumps	152,000 (1968)	2,500	600
Rubella	58,000 (1969)	160	210

From Orenstein *et al.* Immunization (Mandell, Douglas & Bennet. *Principles and Practice of Infectious Diseases*, 4th Ed.) 2770–2790 (Churchill Livingstone).