Less-used vaccines against major diseases are cost-effective, researchers conclude

It is widely accepted that the “traditional” children’s vaccines — such as those against polio, pertussis, diphtheria, tetanus and Haemophilus influenzae type B (Hib) — are a highly cost-effective way to improve health. In contrast, many governments have been deterred from introducing newer vaccines against major diseases, such as hepatitis B or the common pneumonia-causing organism Haemophilus influenzae type B (Hib), into their national immunization programmes because of their higher costs. Now, however, a study has shown that these newer vaccines are cost-effective in most low-income and middle-income countries.

When considering the cost-effectiveness of different health interventions, researchers have assessed how much a given intervention will cost per year of healthy life that it will buy. For example, the traditional children’s vaccines against polio, pertussis, diphtheria, tetanus and Hib, which are given together within WHO’s Expanded Programme on Immunization, have been estimated to cost between about US$ 20 and US$ 40 per year of healthy life saved (or per disability-adjusted life year, or DALY, averted). The World Bank has suggested that in any particular country, health interventions are cost-effective if they buy a year of healthy life for less than the national average per-capita gross domestic product (GDP); many health interventions, such as hospital treatments for some noncommunicable diseases, cost much more than the average per-capita GDP per DALY.

In the January 2000 issue of Health Economics, Mark Miller & Laura McCann examine the cost-effectiveness of some newer vaccines in different regions, taking into account factors such as the estimated disease burden, vaccine and vaccine delivery costs, and the efficacy of the vaccines. They estimate that, in low-income and middle-income countries, hepatitis B vaccine could be delivered for up to US$ 36 per DALY, and often less, depending on factors such as the prevalence of infection and the state of the immunization infrastructure in a country. Hib vaccine could be given for around US$ 20 per DALY in low-income countries in Africa and Latin America. In South Asia’s low-income countries, Hib vaccine could be given for between US$ 17 and US$ 25 per DALY. “These vaccines would cost a fraction of per-capita GDP to save a life-year,” conclude Miller & McCann.

How rotavirus wreaks havoc on the gut

Rotavirus causes some 600 000 deaths a year and about 125 million cases of illness. Most of these deaths are in low-income countries. Death results not from infection per se but from dehydration caused by profuse diarrhoea, nausea and vomiting unless oral rehydration therapy can be given. There are no drug treatments for rotavirus and currently no licensed vaccine following the withdrawal of the first of its kind last year. Now researchers in Sweden have discovered how the virus triggers fluid loss from the intestines, and in so doing have identified new targets for drug development. Ove Lundgren at Göteborg University, and others at the University Hospital, Uppsala and the Swedish Institute for Infectious Disease Control in Solna, studied rotavirus in mice. They found that the virus activates the enteric nervous system, triggering nerves that control both the movements of the intestines and the extent to which they absorb fluid. Cells in the lining of the intestine are stimulated by these nerves to secrete more water, possibly as a defence against toxic products of the virus. In the laboratory, compounds that block the transmission of signals in the enteric nervous system, such as the anaesthetic lidocaine, resulted in greatly reduced fluid secretion in the intestines of rotavirus-infected mice. In unaffected mouse intestines the compounds had no effect on fluid secretion, strongly suggesting that the virus is responsible for the stimulation of the enteric nerves. Although researchers are not certain exactly what viral products trigger the nerves, they suspect the release of specific toxins is to blame — a mechanism common to cholera and some Escherichia coli infections. “The results ... strongly suggest that in most, if not all, intestinal secretory states, nerve reflexes in the [enteric nervous

Fresh clues to treating malaria in pregnancy

Malaria during pregnancy is a serious threat to mother and fetus. The woman faces a substantial risk of death and the fetus is at risk of intrauterine growth retardation and miscarriage. Now, researchers have gained important new insights into the way malaria parasites invade the placenta, and how the invasion might be inhibited. Their work could eventually lead to the development of new vaccines to prevent the disease and new drugs to treat it.

Until now, scientists have thought that the malaria parasite Plasmodium falciparum attaches itself to the placenta principally by invading red cells in the blood. These cells bind to a receptor (chondroitin sulfate A) on placental tissue and form clumps. However, James Beeson at the Walter and Eliza Hall Institute of Medical Research in Parkville, Victoria, and colleagues in Malawi and the United Kingdom, have found another, probably more important, mechanism. They have found that cells infected with P. falciparum bind to hyaluronic acid, a newly discovered receptor on placental linings. In the laboratory, this binding could be inhibited by certain sugar-rich molecules called polysaccharides, and by treatment of the receptor with an enzyme, hyaluronidase. “Approaches to the possible development of new adhesion-blocking therapies or vaccines may need to target both adhesive interactions to be effective,” the authors conclude.


WHO sets up high-level commission to study the links between health and economic growth

Fifteen leading economists and economic policy-makers are to spend two years studying the links between health improvement and economic growth, as part of the new drive of WHO to reduce global poverty by targeting health improvements for the world’s poorest individuals.

The Commission on Macroeconomics and Health was launched in mid-January by Dr Gro Harlem Brundtland, Director-General of WHO. It will be chaired by Jeffrey Sachs, Director of the Institute for International Development at Harvard University in Boston. It includes finance ministers and other senior policy-makers from countries such as Chile, India and Thailand. Other economists on the panel include Robert Fogel of the Center for Population Economics at the University of Chicago, Daniel Cohen of the École Normale Supérieure in Paris and Anne Mills of the London School of Hygiene and Tropical Medicine.

Increasingly, research has shown a relationship between certain broad health indicators, such as life expectancy, and countries’ economic performance. However, more work is needed to clarify the precise nature of the relationship. The Commission will gather evidence in six key areas: the nature and magnitude of the economic outcomes of investing in health; the economics of investing in the research and development of drugs and vaccines primarily for poor populations; the fair use of resources to deal with the major health problems of the poor; the impact of health on international economic relations, such as trade; the impact of development assistance on health; and costs and efficiency in addressing the major disease problems of the poor.

Anne Mills, head of the Health Economics and Financing Programme at the London School of Hygiene and Tropical Medicine, whose staff will also participate, told the Bulletin that policy-makers had not traditionally seen public health as an economically productive investment.

“It was not seen as fundamentally important before. But now it is being shown that health is a major element in economic growth.” The Commission is a means of reinforcing this message with “very good-quality research that is persuasive”, she said.