Immunization Focus

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GAVI

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Immunization Focus

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NEWS

Renewed attack on polio as cases spread to Nigeria's neighbours

POLIO from Nigeria has spread to several nearby countries that had previously been free of the virus, in what WHO experts are describing as "a grave threat" to public health. A dozen children have been paralysed by wild polio in Ghana, Togo, Burkina Faso, Niger and, most recently, Chad. Among these countries only Niger has had any wild polio virus circulating in the past year.

Public health officials are also worried by the spread of infection within Nigeria, from its epicentre in the north of the country around Kano to Lagos, a city of some 10 million people. Nigeria, which has long been a reservoir for polio in West Africa, has now overtaken India as the country with the largest number of polio cases worldwide. As of late October, Nigeria had reported 193 confirmed cases for the year so far. India had so far reported 161 cases, compared with 1600 in last year's outbreak.

The setback means that Benin, Burkina Faso, Ghana, Niger and Togo have had to launch another major polio immunization campaign, at a cost of $10 million, to protect some 15 million children and stop transmission of the virus. Further campaigns, in Chad and Cameroon, will follow in mid-November. A second round of campaigns will follow within weeks. The campaigns in previously polio-free areas will inevitably add to the burden on health services that are already stretched and attempting to improve their routine immunization services.

Genetic analyses of the viruses from the five affected countries indicate that they are closely related to strains currently circulating in northern Nigeria. They are clearly different from strains of the virus that were circulating in these countries before they stopped transmission a year or more ago.

"The spread of the virus is obviously extremely unfortunate, particularly since such tremendous progress has been made in West and Central Africa in 2001 and 2002," said Mr Chris Maher of the Polio Eradication Initiative at WHO.

WHO

He said the partners in the initiative are confident that transmission can be quickly stopped by effective campaigns in the affected countries. He said that the reasons for the spread of the virus in Nigeria were "very clear": immunization had not reached enough children to stop wild polio from circulating. In at least one state, as few as 16% of children had been adequately immunized against polio.

"In order to improve the quality of activities, there must be a major improvement in the level of local government and community engagement, and a significant improvement in training and supervision," said Mr Maher.

Since the start of the Polio Eradication Initiative in 1988, the number of polio-endemic countries has fallen from 125 to seven. ■

Inside this issue

Measles meets its match

An Africa-wide initiative against the continent's biggest vaccine-preventable killer is already exceeding its targets for reaching more children and preventing deaths, as Karen Emmons reports

UNDER September's gruelling sun and the sound of distant gunfire, 90 camels chased through the Eritrean mountains after a pestilent killer that last year took the lives of some 370,000 children across the African continent. Laden with vaccine carriers and health workers, the four-legged mobile units searched for nomadic families in what is part of a massive five-year effort aimed at halving measles deaths in Africa by 2005.

Martin/WHO

Up for it: children at the campaign in Eritrea

Down in the lowlands the task was easier. Children lined up under their striped umbrellas by the hundreds. Explained one mother at the Seboo post: "The vaccine is important because it protects against the measles, which causes blindness…and lots of deaths."

In Geza Hamle, a recently trained health worker gently filled each auto-disable syringe, promptly pricked a child and, fingers crossed, sent her into a future safe from measles. Returning the syringe to its safety box that would later be burned and buried, the Eritrean health worker turned to the next arm, knowing that these vaccinations fail the first time in about 10%-15% of children (see Box 1). "None of us cried, except the very young," beamed nine-year-old Gebre who with his friends showed off their just-pricked arms.

Health officials know that the best possible protection occurs when more than 90% of a population is vaccinated against the highly contagious virus, creating a "herd" immunity that can indirectly safeguard the minority who remain unvaccinated or in whom the vaccine doesn't work. Establishing that herd immunity is especially difficult in Africa where routine measles coverage has been feeble – under 60% in about 17 countries.

Experiences in South America and Southern Africa have proven, however, that providing all children aged between nine months and five years with two opportunities to be immunized can achieve the protection needed for near-zero levels of measles mortality. Following those experiences, so began the Measles Initiative in 2001. The initiative, which is backed by a group of partners led by WHO, UNICEF, the US Centers for Disease Control and Prevention (CDC), the UN Foundation and the American Red Cross is targeting all 32 sub-Saharan African countries where measles is the leading vaccine-preventable killer of children. The Eritrean camels and nomadic families are part of the 24th country campaign in a strategy to immunize 200 million African children that, according to Mark Grabowsky of the American Red Cross, "is ahead of schedule, exceeding targets and under cost".

1: When is the right time to vaccinate?

The ideal age for the first measles vaccination is after a child's first birthday. But in communities where the chances of being exposed to the virus are high, there's a dangerous "window" for babies after they reach about six months of age when they have no protection against it. Babies inherit antibodies against measles from their mother at birth, but these wear off by around six or seven months. If a child is vaccinated before the antibodies die out, the vaccine will be neutralized and the child will not be immunized.

"In Africa, when measles vaccine first became available, we had to balance effectiveness with the chance of an infant being exposed to the virus," says Bradley Hersh, a medical officer at WHO. Officials came up with nine months as the necessary age to begin vaccinating. "In a developed country where there is minimal threat of exposure, 12-15 months would be the ideal age," adds Hersh.

In an area with a high burden of disease, such as Africa, the routine system is not strong enough to stop the circulation of the measles virus. To create the herd immunity in which very young children are indirectly protected requires coverage of at least 90%. It is now widely accepted that the only effective way to achieve this level is to give all children two opportunities for measles immunization.

Some campaigns conducted in the early 1990s in Southern Africa were restricted to children younger than five years, because most deaths occurred among those aged one to four years. "Those campaigns weren't successful for very long because they allowed transmission to continue in older kids, who then became sources of infection to infants," Hersh says. To provide direct protection and indirect herd immunity, officials set nine months to 15 years as the necessary range for vaccinating during the catch-up campaigns.

WHO and UNICEF have also targeted an additional 13 measles-endemic countries outside Africa. Earlier this month, in a sign of the success of the initiative in Africa so far, representatives from all 45 measles-endemic countries met in Cape Town, sponsored by WHO and UNICEF, to discuss how to engage new partners for sustainable measles mortality reduction in other regions of the world.

‘There is no quick fix – we need good routine immunization *and* campaigns’

After three years, the list of the Measles Initiative’s achievements is lengthy: by December, 28 countries will have vaccinated 115 million children with a coverage range of between 93% and 97%. As a result, they have cut the number of measles cases in each country by at least 58%, rising to 96% in some countries, and have averted an estimated 270,000 deaths. Total costs for the five-year strategy are estimated to reach beyond US$160 million (or about 80 cents per child), shared largely by the five partnering organizations, with inputs from other donors and governments.

Stronger routine immunization

But the campaigns do more than vaccinate children. They are also designed to build up sustainable protection against measles and other priority diseases by improving countries’ systems for delivering routine immunization. The Measles Initiative urges governments to put immunization high on their development agenda. It has prompted governments to plan for waste management, systematized the use of auto-disable syringes, strengthened the cold chain process, improved surveillance, upgraded laboratories for handling blood specimens and increased various partnerships in funding and implementation. For example, health workers giving measles immunization have also provided families with insecticide-treated mosquito nets, de-worming pills and vitamin A supplements at the same time.

While parents have loudly demanded action, the successes are credited largely to the partnership of national governments, donors and implementers orchestrating the move against measles. “It is good – we got the amount of money we requested. It really was helpful,” says Filli Said Filli, immunization programme manager in Eritrea, where 1.3 million young people were targeted in the recent campaign. “We have developed a five-year plan and after two years, we’ll have a follow-up campaign for under-three-year-olds.”

Catch up, keep up, follow up – the strategy

For years a debate lingered on whether to attack measles by strengthened routine immunization or by polio-style campaigns. The experiences in the Americas showed a need to combine both. “There is no quick fix,” explains Bradley Hersh, at the World Health Organization. Campaigns alone cannot solve the problem, nor can the routine delivery of vaccinations alone.

In this approach, a countrywide campaign supplements routine vaccination for children at nine months of age, “cleaning” the environment. This catching-up clears a safe path for very young children to survive to receive the routine dose of vaccine. The key to sustained protection remains with vigilant routine coverage keeping up with all newly born children. A follow-up campaign three or four years later provides the opportunity for measles immunization for those who missed their vaccination at nine months or in whom the vaccine failed.

Developed by the Pan American Health Organization (PAHO) in the early 1990s, the strategy of “catch up, keep up and follow up” cut the region’s measles cases from more than 600,000 in 1990 to 500 a decade later. So far this year, there has been no transmission of measles in the Americas.

UNICEF and the World Health Organization officials adopted that strategy as an experimental response to requests by health officials in seven southern African countries in 1997 to add a single mass campaign for children younger than 15 years to the routine dose at age nine months, thus offering the two opportunities for immunization. The number of reported measles cases across the seven countries dropped from over 50,000 per year before the campaigns to 100 cases in 1999; measles deaths decreased from an estimated 3,700 to two in 1999 and zero in 2000. The question then became, how far up the continent could the strategy work?

2: Personal digital assistants make a difference

Thirty Red Cross volunteers in Ghana had never touched a computer or conducted a field survey. But two days of training with a personal digital assistant (PDA) changed the nature of follow up. While the burden of data collection and entry with paper and pen limits the size and accuracy of surveys, the hand-held computers allowed a survey of more than 2,400 families in three days. Within six hours of the surveyors returning from the field, the data were analyzed and the report available to the Ministry of Health, a process than normally takes weeks to months.

The approach was so innovative that it won the Stockholm Challenge award in 2002 for information technology. One of the barriers to wider use of PDAs is the cost and complexity of the software. The American Red Cross is working with CDC to create shareware that can help field staff to do PDA surveys without external technical support.

People who have never touched a computer pick up the PDA and “love it”, says Grabowsky. “They immediately understand its power and value.”

With governments asking for assistance, a handful of officials who had experience in PAHO or who were then working in Africa shared a resolve that "something had to be done" for controlling measles. "We had an excellent, safe and cheap vaccine," says Hersh. "The challenge was the implementation – making sure all kids are vaccinated."

In January 2001 they agreed to mobilize resources for Africa through a novel collaboration between the five key partners. They set up a weekly conference call (that will continue through 2005), open to any stakeholder, in which plans are fine-tuned, problems identified and decisions made. Within months they had pooled together US$20 million and the first supplemental campaign vaccinated 3.7 million Tanzanian children in seven days the following September.

‘ People are willing to queue for hours, for fear that the vaccine will run out ’

Each of the seven southern African countries that experimented with the strategy in the late 1990s has successfully started implementing follow-up campaigns every four years. This is to protect all children born after the initial catch-up campaign.

The initiative in Africa

The Partnership covers the costs of bundled vaccines and most of the operational costs through funds provided by CDC, the UN Foundation, the American Red Cross and Vodafone, which then are channelled through UNICEF and WHO. Each country contributes to its campaign as well, though the portion is based on its economic situation. To ensure resources for the long-term needs, governments have been asked to increase their budget for routine immunization.

National plans

To receive Partnership funds, health officials in each targeted country must meet certain requirements very similar to those required by GAVI and the Vaccine Fund for support with new and under-used vaccines. They must draft a three- to five-year strategy for measles control, as part of their overall immunization plan. In addition, they must draft a one-year plan of action, from the district level upwards, for the campaign. This plan must be approved by the country's Inter-agency Coordinating Committee. The plan is then submitted to the WHO Regional Office for Africa for technical review. The action plan requires an assessment of existing infrastructure and sometimes, as in Angola where there had been no census for 30 years, a population and health facility count.

Equally important, countries must make proper provision for safely disposing of the needles and syringes and use safe injection practices, including auto-disable syringes. "We've made it an integrated part of the strategy. Without it, we won't send funds," says Edward Hoekstra, senior health advisor with UNICEF's Global Measles Programme. With the Partnership's resources, countries such as Mali, Togo, Burkina Faso, Ghana, Benin and Cameroon installed incinerators to burn used injection equipment in nearly all districts.

Before each campaign, health workers are trained in using the auto-disable syringes as well as other elements of routine immunization services, such as vaccine and cold chain management and planning. These practices have been noted in every government's post-campaign impact assessment report as a permanent fixture in the routine system.

Getting people involved

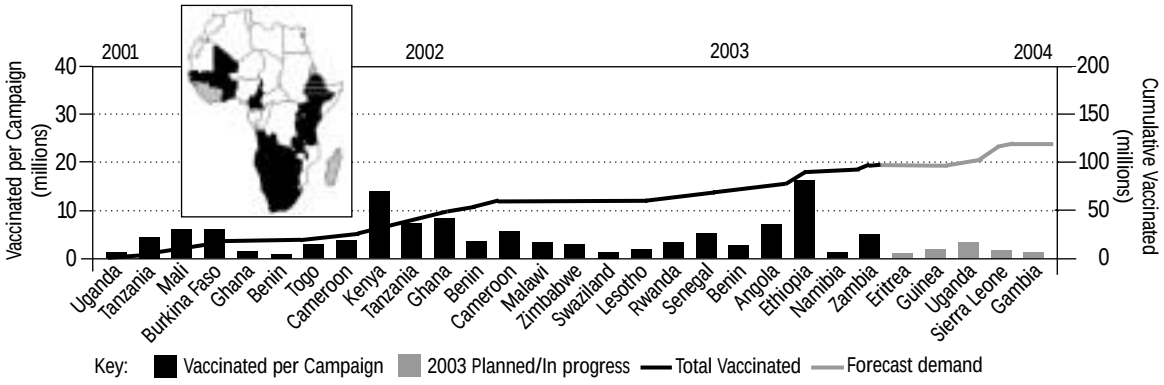
In the months prior to the campaign, the Red Cross and other local partners begin collecting volunteers to mobilize children – in Kenya, more than 13,000 people offered to help; in Zambia, each of the vaccination sites had six to seven volunteers. An advertising blitz takes off a week before the vaccination blitz, using radio, television, plays, theatre, music and concentrated child-to-child activities in schools.

"We make extraordinary efforts to reach every child, especially the poorest and highest-risk," say Grabowsky. The Red Cross volunteers knock door to door in some areas or drive village to village and find children. Volunteers write down the name of every eligible child in many villages and do individual follow-up to make sure they all were vaccinated. However, in most places achieving a high turnout has not been difficult. So great is the terror of measles among parents, people are willing to queue for hours in the first few days, for fear that the vaccine will run out. ’

Martin/WHO

In action: a vaccination campaign post in Eritrea

Figure 1: Progress of the Measles Initiative July, 2001 – December, 2003



Source: Mark Grabowsky, American Red Cross

Piggy-backing

To maximize the moment, health officials have exploited many of the campaigns to deliver other interventions at the same time. Vitamin A supplements have been provided in almost all campaigns. In Ghana's Lawra district, officials distributed 14,000 insecticide treated mosquito nets during the measles campaign, bringing nets to 80% of households where previously they'd been available to only about 7%. Health officials distributed nearly 83,000 treated nets in Zambia and gave mebendazole (de-worming) tablets to 1.6 million children.

With guidance from WHO's African regional office, each country has conducted surveys to assess the success of campaigns in terms of their coverage and their impact on the immunization system, as well as installing systems for monitoring adverse events following immunization. Hand-held computers have been used in three countries for exit interviews and field surveys, allowing community members to conduct the evaluations (see Box 2). In addition, countries have strengthened their measles surveillance activities, building on and extending surveillance structures originally developed as part of the Polio Eradication Initiative.

Difficulties

"It takes a lot of work to get the money to the ground on time," admits Andrea Gay, whose role with the UN Foundation is to coordinate the donations. Uncertainty about when money would arrive resulted in delayed field orders for supplies and delays in the building of incinerators to destroy the syringes in time for most of the campaigns. Also, some shipments of vaccine were late being delivered and had to be airlifted, increasing the costs of the operation.

And there have been a few outbreaks of measles among children. Robert Kezaala, Medical Officer for the Expanded Programme on Immunization in WHO's regional office for Africa, says there were outbreaks in Burkina Faso, Cameroon and Tanzania in 2003. These outbreaks were triggered by a relaxing of routine coverage, which left children vulnerable to becoming infected when children with measles entered the country from other countries where routine coverage is lower or where a campaign had not yet taken place. A significant proportion of the cases had not been vaccinated, with the majority in the target age group of under 15 years. Kezaala emphasizes the need for high levels of routine coverage, and for countries to act together in blocks to reduce the risk of major importations of measles cases.

Meeting the Millennium Development Goal

Now, the partners in the initiative are giving serious attention to strengthening the routine immunization systems in the countries. "We're trying to reach all children in each district of the measles priority countries with the first routine dose by nine months of age. We're already seeing a gradual increase in immunization coverage in countries targeted," Hoekstra says.

Complaints about the initiative seem to be few. "It's quite phenomenal what countries have done in two and a half years with Partnership support," says Gay. She believes that the Partnership is a work in progress, improving campaign by campaign.

The Partnership has most of the funding to cover eight campaigns with a target population of 59 million children in 2004. Because of its size, only Nigeria remains unfunded, and thus unscheduled.

The measles campaign is expected to surpass its target of halving child mortality by 2005, compared to 1999 levels. Cutting measles deaths in Africa will certainly help to achieve the UN Millennium Development Goal to decrease under-five mortality. In the process, the Measles Initiative will have delivered a wide range of social benefits. Provided high routine coverage is maintained, the sharp reduction of measles cases will reduce demands on overburdened health care delivery services, freeing health workers and resources to deal with other priorities, such as malaria and HIV/AIDS. ■

With reporting from Rebecca Martin, WHO, in Eritrea.

Karen Emmons is a journalist based in Bangkok.

Other agencies contributing to the Measles Initiative are: International Federation of the Red Cross, Canadian International Development DA, Right to Play, USAID, JSI Incorporated, BASICS, national Red Cross societies and ministries of defence and education. Becton, Dickinson & Company, supplier of auto-disable syringes, assisted in injection-safety training in Ghana, Angola, Namibia and Zambia.

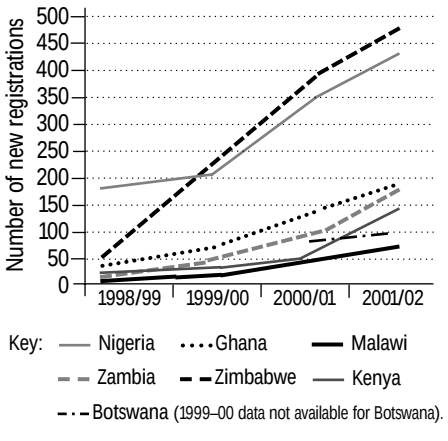
The health service brain drain: what are the options for change?

Every year, health workers leave low-income countries in their thousands to seek better pay and professional prospects abroad. Rather than try to prevent the free movement of people, countries and their international partners are now seeking workable and ethical solutions

DR FRANK Nyonator has a major problem. As director of policy and planning for Ghana's health service, he is losing a stream of nurses, doctors and pharmacists abroad every year. "With the nurses, we are talking in terms of thousands," he says. Most head for the United States and the United Kingdom for higher pay and better education prospects; few return. Not only does their departure leave holes in an overstretched health system; it also deprives Ghana of the return on investment in their training, and effectively subsidies the health systems of much richer countries that have failed to "grow their own" workers in adequate numbers.

Ghana is not, of course, unique. The health workers' brain drain is also damaging other developing countries, particularly in Africa. Among those worst affected are South Africa, Zimbabwe and Nigeria. In some of these countries, the rate at which nurses are lost appears to be accelerating. While industrialized countries such as the US and the UK have long filled the gaps in their nursing workforces from abroad, they have traditionally relied on countries that have trained more nurses than they need – such as the Philippines. Today the rich countries are increasingly employing nurses not only from the traditional "exporting" countries but also from African countries that have acute staffing shortages of their own. There is no one to fill the posts that their emigrant workers vacate, and health services – their immunization programmes included – are suffering.

Figure 1: New registrants on UK nursing register from selected sub-Saharan African countries, 1998–2002



Source: Nursing and Midwifery Council, London.

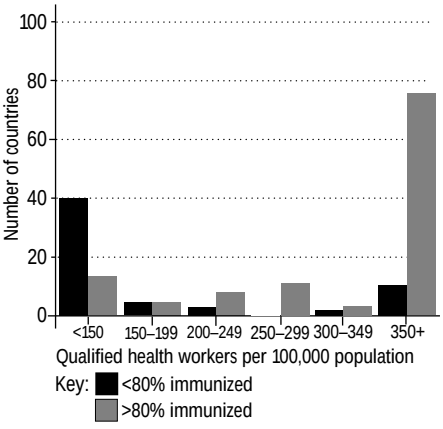
Dr Nyonator understands exactly why health workers want to leave low-income countries. "The reasons are not secret," he says. First, the pay is poor and may not stretch to buy such luxuries as a house or a car. "People are scared that, if they remain in the system, they will not be able to make ends meet. Pension schemes are not adequate and people just want to make sure that they have got something that will provide them with security in the future." Second, says Dr Nyonator, among doctors and pharmacists, there is a demand for postgraduate training, which until now has not been widely available from domestic institutions. The limited postgraduate facilities that exist have been dysfunctional, he says.

Measuring the flow of staff

Accurate information on the scale of the "human resources" shortage is difficult to find. There are no comprehensive databases. But the patchy available figures hint at serious annual losses from countries that can ill afford to lose any health workers. Around 2500 nurses applied to emigrate from South Africa in 2001 (1). The Ghana Registered Nurses' Association says that more than 3000 nurses left the country in 2003. In 2001, 473 nurses from Zimbabwe registered to work in the UK alone. That might sound like a small number, until you discover that the total number of nurses to qualify in Zimbabwe that year was only 737. Other African countries with a small cadre of nurses, such as Malawi, are also seeing sharp increases in the numbers lost, largely to the UK (Figure 1). Physicians are also leaving low-income countries in large numbers, although their numbers do not appear to be rising like those of nurse emigrants. In the US, 30% of migrant physicians are from India and Pakistan and in the UK, 20% of migrant physicians are from Africa.

The outward flow of staff is not matched by equal numbers coming in to these countries, so vacancies in nursing and specialist medical positions are widespread. For example, in South Africa, 60% of institutions surveyed said that they had trouble recruiting staff to replace emigrants (1), while Malawi reported that almost 53% of nursing posts were vacant in 1998 (2). Inevitably, this causes problems in delivering healthcare; for example, measles immunization coverage tends to be high when staffing ratios are good, and low when staffing ratios are poor (Figure 2).

Figure 2: Staff required: measles immunization rates are rarely high in understaffed countries



Source: WHO/UNICEF

One particular problem is the loss of specialist staff with years of experience; their numbers are small, but the holes that they leave may take as many years again to fill. Adelaide Shearley is WHO ◗

advisor for the Expanded Programme on Immunization in Namibia, and has also worked for the immunization programmes of two additional countries in sub-Saharan Africa. In each, she has watched colleagues leave specialist roles in public health – such as surveillance – to take up more general clinical nursing posts abroad. "All the investment is lost," she says.

Wake-up calls

Not before time, the brain drain in health workers is attracting new attention – from governments and from international players such as WHO, the OECD and the Rockefeller Foundation. The GAVI partners have also recognized that the shortage of health workers must be addressed if countries are to meet their targets for increasing immunization coverage within a sustainable health system. WHO, which has set up a programme of work on human resources, is currently gathering much-needed data on health workers' migration before considering the possible policy options for governments. But, warns Dr Barbara Stilwell at WHO, there will be no quick fix: "It's not as simple as some people would like to think."

'Money sent home by emigrant workers to their families in developing countries now exceeds the total official development assistance paid by governments in industrialized countries'

Indeed, many simplistic responses have been proposed. "People zoom in with knee-jerk reactions," says Dr Akram Eltom at the International Organization for Migration. "For example, they suggest raising the cost of emigration, or raising other barriers [to emigrants]." But, he says, it would be unethical to prevent workers from leaving their country of origin. Indeed, globalization has positively encouraged an international market for skills in numerous other areas, such as information technology. Why, then, should healthcare skills be viewed differently?

People have a right to move, to seek improved career prospects and secure incomes. Poor working conditions, a lack of education opportunities and low pay act as "push" factors in poor countries, while the "pull" factors in richer countries include the promise of wages up to 25 times higher than at home, safer working conditions, and better opportunities for continuing professional development, says Dr Stilwell. Equally important, health workers who emigrate continue to contribute to the economies of their country of origin, because of the money they send home to their families. In fact, money sent home by emigrant workers to their families in developing countries now exceeds the total official development assistance paid by governments in industrialized countries, says Dr Stilwell. The money is not ploughed back into a health service, however.

Ways to change

In the search for intelligent responses to the problem, analysts are now looking in greater depth at the reasons why health workers leave their home countries, with the aim of informing new policies and identifying ways to change behaviour.

Dr Marko Vujicic, an economist, and his colleagues at WHO have assessed the importance of salary in attracting health workers from developing to industrialized countries. Their conclusion, says Vujicic, is that salaries are a key factor influencing the supply of migrants, although not the only important factor. The differences in earnings between richer and poorer countries are stark, even when the figures are adjusted for purchasing power to take account of differences in the cost of living between countries. For example, says Vujicic, the nurse wage in Australia and Canada is about 25 times the nurse wage in Zambia, about 14 times the nurse wage in Ghana and about twice the nurse wage in South Africa. For doctors, the differences are similarly large.

But other factors, such as living conditions, safety at work and the options for professional development also seem to be important. If wages were the only factor, says Vujicic, the countries whose workers stand to gain the largest income increase from leaving should in theory have the highest numbers of would-be emigrants. In this case, for example, Ghanaian nurses should be keener to leave home than South African nurses, because South African nurses can "only" double their earnings while Ghanaians can increase theirs 14 times. In reality, the proportion of health workers who intend to emigrate from South Africa is approximately equal to that in Ghana, suggesting that other factors beyond money influence workers' decisions.

Staff motivation is clearly important too, says Dr Stilwell. Motivation matters in any workplace, but where rising numbers of staff are leaving, it can rapidly deteriorate. Moving abroad can symbolise optimism about one's working future, while staff left behind can become demoralised. This is most likely when supervision is inadequate, workloads are heavy, and managers have little authority to demand more time from people who are earning a pittance in poor working conditions.

Ethical responses

Governments in low-income countries are beginning to discuss ways to increase their health worker's incentives to stay. Options include better housing, transport to work, cheap car loans and even basic occupational health improvements to make nurses' work safer. For example, Dr Nyonator says, proposals currently being considered by the government of Ghana include favourable car loans, housing loan schemes, and increased remuneration for staff willing to work in remote rural areas. The government is also setting up a postgraduate medical college, which is due to begin training in 2004.

Industrialized countries' responsibilities

Increasingly, however, analysts agree that the problem cannot be solved by the low-income countries alone. The International Council of Nurses, which with WHO and others has recently analysed the international flow of staff (1), says that it is unacceptable for rich countries with "dysfunctional" health systems, characterised by an inability to "grow their own and keep their own" staff, to exploit the push factors in the developing countries from which they recruit their much-needed staff.

Aggressive recruitment of nurses from developing countries may give the rich countries a quick fix, says the ICN, but it will not produce lasting solutions to their domestic problems. Rather, the countries with the worst staffing shortages – such as the UK – should assess the reasons for their failure to recruit and retain their own workers and change their own policies.

Governments in industrialized countries are now being asked to consider various other options. For example, international development assistance funds, which would not normally be spent on staff costs, could be used to boost some aspects of the remuneration package for health workers who stay in their own countries. Governments in industrialized countries that poach workers from developing countries might be required to pay compensation to the source country for the costs of each worker's training and also, possibly, the loss of tax revenue.

Athough such schemes may sound relatively radical, Ghana is just one country that has already discussed with partners such as the World Bank ways to use international development money to boost the remuneration packages of health workers. "There has been a good response," says Dr Nyonator. Perhaps, at last, there is a prospect of change. ■

Phyllida Brown

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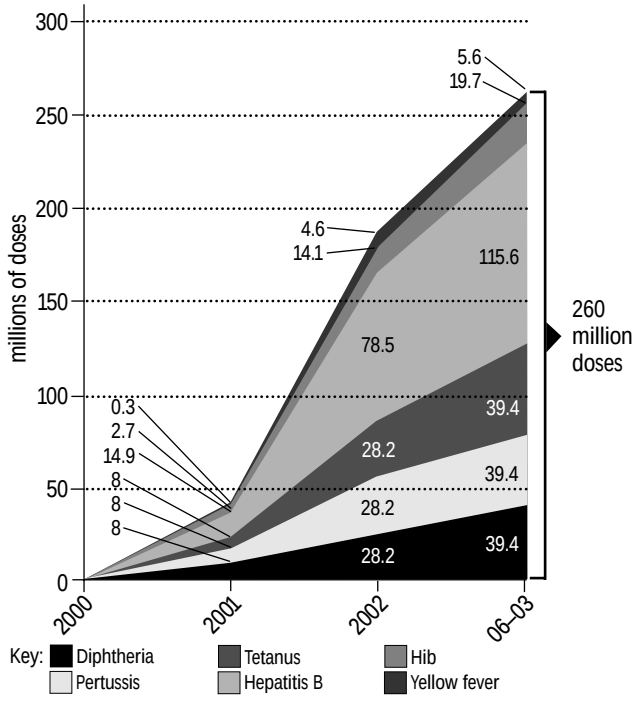
GAVI key statistics, mid-2003

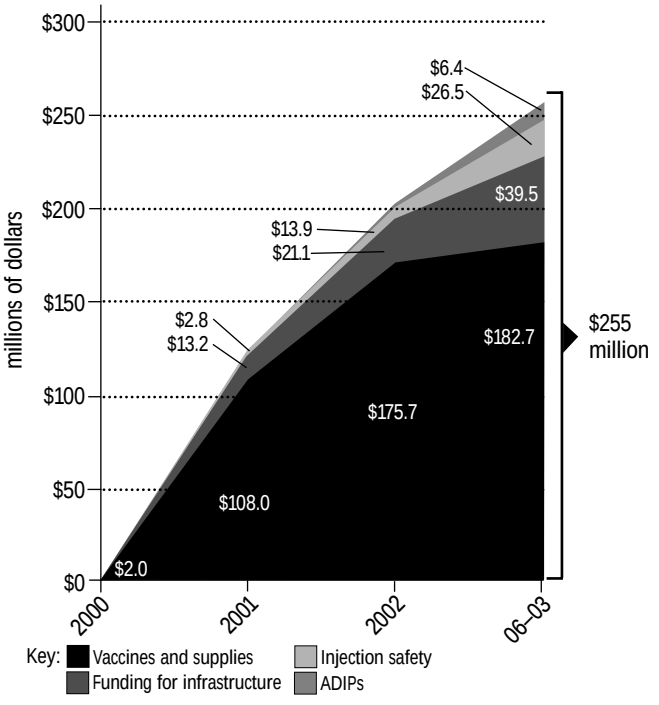
Vaccine doses delivered



Over 30 million children reached with under used vaccines (HepB, Hib, Yellow Fever)

Source: GAVI Secretariat

Resources disbursed from The Vaccine Fund



Source: GAVI Secretariat

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