South Africa, where about 10% of the population is HIV positive, is developing a promising vaccine tailored to its specific health needs. Most HIV vaccines being developed are for virus subtype B, the dominant strain in the United States and Europe, but there is no certainty these would be effective against subtype C of the AIDS virus which accounts for more than 90% of HIV infections in southern Africa.

The project has state and private sector funding and aims to produce a vaccine for subtype C. It was initiated by South Africa's Medical Research Council. Phase I trials started in 2003.

India's generic drugs industry has pioneered fixed-dose combination antiretroviral medicines. These are not only more affordable for poor countries with high HIV infection rates, but these two- or three-in-one pills and blister packs make it easier for patients to follow treatment.

By copying and combining two or three drugs, each originally developed by a different R&D company, Indian companies Cipla and Ranbaxy have have come up with competitive products unmatched by R&D originators like multinational, GlaxoSmithKline.

That success underscores one of the greatest challenges to drug production in developing countries: ensuring that medicines meet international criteria for quality, safety and efficacy.

A report to the World Health Assembly in May 2004, called on WHO's 192 Member States to cooperate more closely on drug regulation to address the need for more stringent regulation in developing countries.

This is particularly pressing in India which will be more reliant on R&D drug innovation from January 2005, when it joins the international patent system and can no longer copy new patented drugs.

Dr C.M. Gupta, Director of the Central Drug Research Institute in Lucknow, said small pharmaceutical firms may be unable to stay afloat without government aid after India joins the international patent system.

He was optimistic about the sector's prospects as a whole, citing advantages such as lower researchers' salaries and manufacturing costs.

Gupta said his research team was devoted to finding drugs for neglected diseases and had already produced two successful antimalarial drugs.

"One advantage is that we have a large patient pool for clinical trials. Also, from discovery to pharmaceutical toxicology and clinical trials things go fast," Gupta said.

In India, researchers are looking to Ayurveda traditional medicine to find plants or herbal remedies that can be converted into modern medicines.

In South Africa, researchers are investigating a diverse plant life for new active ingredients which includes Fynbos, one of the world's six floral kingdoms that is unique to the country.

Dr William Pick, President of the Medical Research Council of South Africa told the *Bulletin* that researchers were working with 20 promising compounds or molecules derived from indigenous plants to find medicines to treat malaria and tuberculosis. Pick acknowledged the difficulties: "We lack laboratory facilities and hi-tech equipment and financing of projects is difficult."

In China, the *Artemisia annua* plant was used for centuries in traditional medicine to combat fever. Today its derivatives, usually combined with synthetic compounds, are active ingredients in several antimalarial drugs.

Rather than trying to produce the medicines itself, China has become a major exporter of artemisinin to industrialized countries, but this could change in view of the trend of outsourcing.

China has recently started to make its highly educated scientists available to companies looking to outsource some of their R&D activities for a fraction of the cost of their counterparts in industrialized countries.

Swiss pharmaceuticals giant Novartis recently formed a partnership with the government-run Shanghai Institute for Materia Medica, where scientists are trying to identify compounds derived from traditional Chinese medicines for new medicines. Roche Ltd, also of Switzerland recently opened an R&D centre near Shanghai employing 40 Chinese scientific researchers.

Developing countries also overcome funding shortages and lack of technology by entering private–public partnerships (PPP) to develop drugs for neglected diseases.

Big pharmaceuticals companies contribute molecules, manpower and machines to non-profit groups which coordinate product development and are backed by private foundations or governments of developing countries.

There are 23 PPPs working on drugs, 16 on vaccines and 20 on non-pharmaceutical products, such as antimalarial nets. Two of those, Medicines for Malaria Venture and the International AIDS Vaccine Initiative, have several products in clinical trials.

Pharmaceutical foundations have also opened research centres for neglected diseases in developing countries: for example, Novartis in Singapore for tuberculosis and dengue and GlaxoSmithKline in Spain for developing medicines for diseases that affect those countries, such as malaria and tuberculosis. ■

Fiona Fleck, *Geneva*

> "Of some US$ 105.9 billion annually spent on global health research, only a fraction — 4% — or a rounded-off US$ 4.3 billion, is spent by middle- and low-income countries, according to the Global Forum for Health Research."

Health worker shortage could derail development goals

Senior government and development officials gathered in the Nigerian capital Abuja agreed urgent action was needed to tackle a growing shortage of doctors, nurses and other health workers.

They warned this could undermine global efforts to cut poverty and disease.

The High-Level Forum meeting on the health Millennium Development Goals, on 2–3 December, focused on strengthening health systems and ways to increase the volume, coordination and efficacy of aid to achieve the goals. Officials agreed that solving the crisis in human resources was key to advancing their development agenda.

"When aid is unpredictable, we cannot blame planners in our countries for being overcautious," said Nigerian Health Minister Eyitayo Lambo. "We simply cannot commit to hiring new doctors and nurses or to putting more people on treatment for AIDS if resources suddenly dry up."

"We understand donors need reassurance that their money is well spent. But governments also need freedom to set priorities," the minister said.

An action agenda submitted to the meeting called for more global solidarity, for example that industrialized countries adopt an ethical approach to recruiting health workers from developing countries.

Under the slogan: Train, Retain and Sustain, it called on African countries to improve training, compensation and working conditions of health professionals.

The agenda also urged governments to learn from the lessons of countries, such as Argentina, Brazil and Iran, on a number of workforce-related issues, for example: recruitment best practices for training and retaining a sufficient number of health workers.

Ministries of labour, finance and education — and not just health — should be involved in health workforce issues. Governments should seize the political momentum created by the Millennium Development Goals to promote their health and development agenda, it said.

There are an estimated 750 000 health workers for a population of 682 million people in Africa: 10–15 times lower than in OECD (Organisation for Economic Co-operation and Development) countries, according to two reports prepared for the Forum: Addressing Africa's Health Workforce Crisis: an Avenue for Action and Health Workforce Challenges: Lessons from Country Experiences.

The region accounts for only 1.3% of the world's health workforce but 25% of global burden of disease.

To achieve the Millennium Development Goals, the minimum level of health workforce density is estimated at 2.5 health workers per 1000 people compared with the current average of 0.8 health workers. Only six unnamed African countries currently have the minimum workforce capacity, according to the meeting documents.

"If we want a noticeable improvement in reducing maternal mortality rates and improving child health, then we have to have a higher density of health workers," Kerstin Leitner, WHO Assistant Director-General for Sustainable Development and Healthy Environments, told the *Bulletin*.

Africa will require an estimated one million additional health workers to ensure the staffing required to deliver basic health interventions.

The two reports identified four key "hot buttons" responsible for the chronic shortage.

- Insufficient training opportunities. Two-thirds of sub-Saharan African countries have only one medical school, and eleven have no medical schools at all. There is too much emphasis on highly skilled personnel rather than other health workers.
- Deteriorating health of the workforce. In many sub-Saharan African countries between 18% and 41% of the workforce is already infected with HIV. In Zambia and Malawi, death of nurses represents almost 40% of the annual output from training, whereas in Ghana there has been no noticeable increase in the health worker death rate.
- Rural/urban imbalance. In the United Republic of Tanzania, the city of Dar es Salaam alone has nearly 30 times as many medical officers and medical specialists as other rural districts. Only about five of Uganda's 100 or so surgeons work outside urban areas.
- The "brain drain" of health professionals from poor developing countries like Ghana, Kenya, Malawi and Zimbabwe to higher-income developing countries such as South Africa and Botswana, and then on to richer countries such as Australia, Canada, New Zealand, the United Kingdom and the United States. An estimated 18 000 Zimbabwean nurses work abroad, whilst more Malawian doctors reportedly practise in the northern English city of Manchester than in all of Malawi.

At the same time, it is estimated that a further one million nurses will be needed over the next 10 years to meet the shortfall in the United States. By 2008, the United Kingdom will need 25 000 doctors and 250 000 nurses more than it did in 1997, and other industrialized nations predict similar shortfalls. Bilateral agreements to regulate the movement of health workers have so far had limited impact.

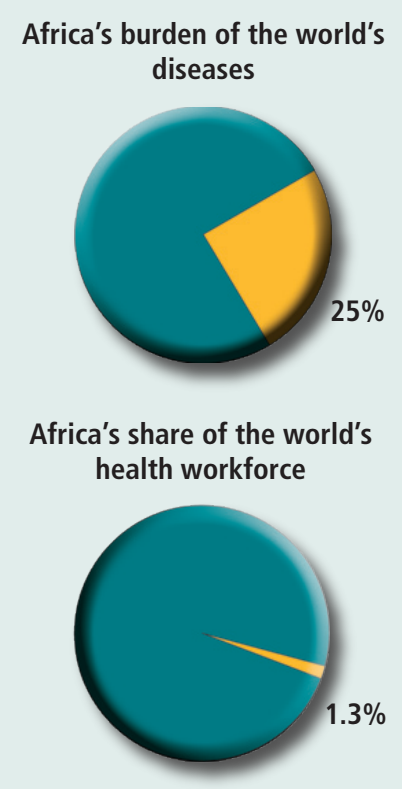
Leitner described the shortages as "staggering", especially given the relatively high unemployment levels in some OECD countries.

She said there was a role for WHO in advising governments how to manage the migration.

"In terms of movement of people it is a good thing to have health personnel with international experience, but this should not lead to a net reduction of health personnel in developing countries," Leitner said. "At the moment it is a one way ticket." ■

Clare Nullis-Kapp, *Cape Town*

> "When aid is unpredictable, we cannot blame planners in our countries for being overcautious. We simply cannot commit to hiring new doctors and nurses or to putting more people on treatment for AIDS if resources suddenly dry up."
>
> *Nigerian Health Minister Eyitayo Lambo.*



Source: WHO